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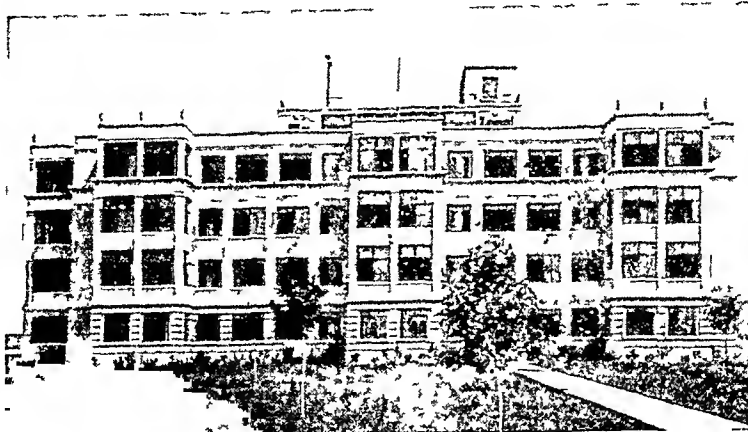
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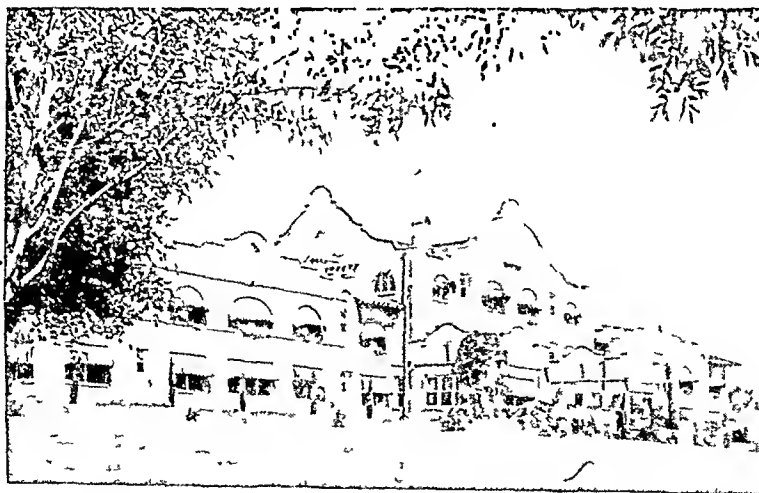
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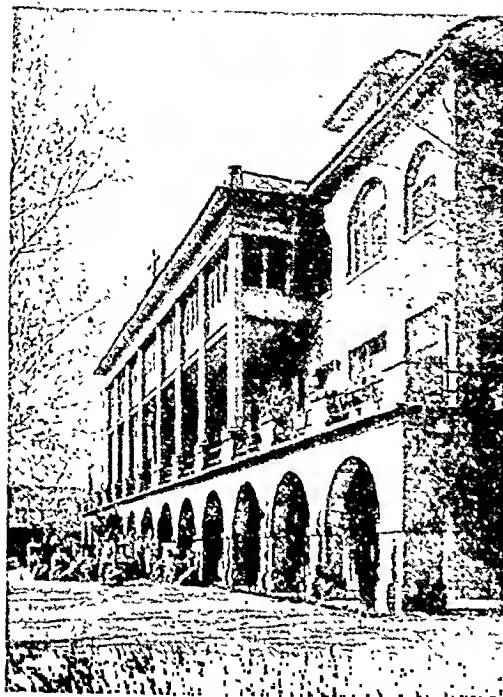
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## DISEASES

OF THE

## CHEST

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*"The most important factor in diagnosis in  
 the majority of cases of pulmonary tubercu-  
 losis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

THIS IN CONFORMITY with a policy which was started at the inception of this journal, one issue of DISEASES OF THE CHEST, is devoted each year, to the presentation of a picture of sanatorium facilities, of the advances made in tuberculosis control in one state or in a group of states in this country.

In 1935, the August issue of DISEASES OF THE CHEST, was dedicated to the State of New Mexico. In 1936, the May issue of DISEASES OF THE CHEST, was dedicated to the State of Missouri.

This year, it is our privilege and pleasure to dedicate this issue of DISEASES OF THE CHEST, to the States of North Carolina, South Carolina, Virginia, Georgia, and Florida; and the issue is to be known as the "SOUTH ATLANTIC STATES ISSUE."

The tuberculosis problem which has had to be faced in the south Atlantic states has been a large one, especially on account of the large colored population. That this problem is being met in these states is evidenced by the sanatorium facilities already at hand and those in preparation. The physicians who are leading the fight in these states are to be congratulated upon their results. The tuberculosis mortality for the white population in these states is now about equal to those for the entire country.

Each of the states represented in this issue has contributed one or more scien-

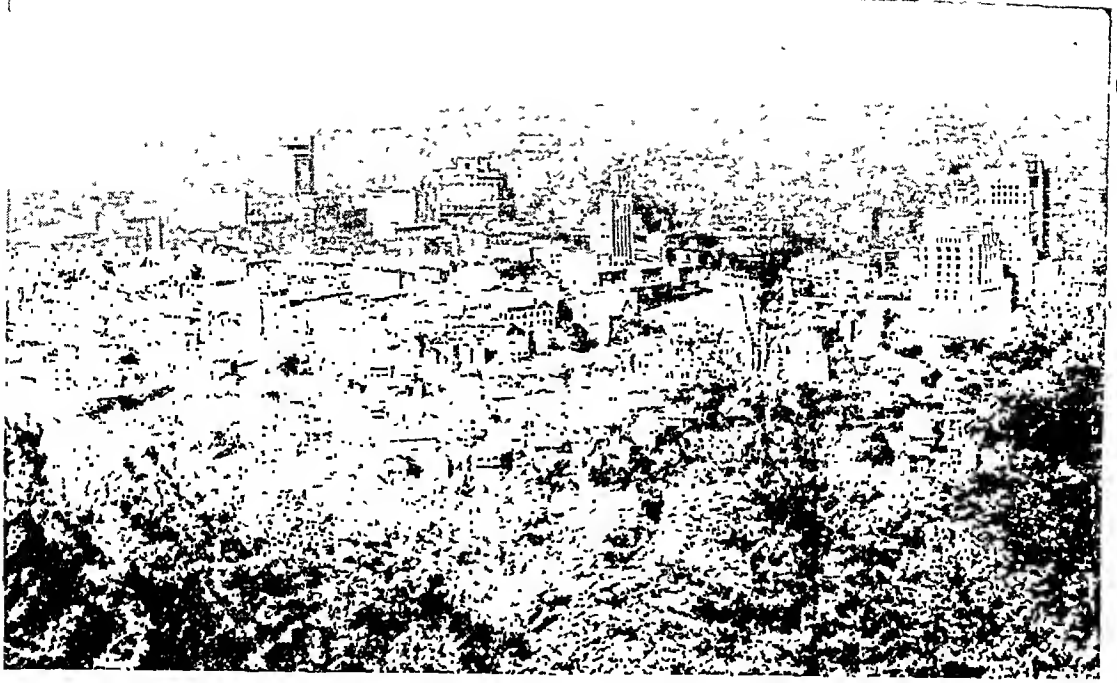
tific papers, dealing with subjects related to chest diseases, and written by physicians who are closely identified with the treatment of chest diseases in those states. Each of these states has presented a picture through the printed word and by illustration, showing the present facilities for the treatment of the tuberculous within those states.

It is the purpose of the Editorial Board of DISEASES OF THE CHEST, to eventually compile similar issues for each of the forty eight states and the District of Columbia; either through the publishing of the data from single states or in groups of states, as was done in this instance. With the publication of this issue, seven of the forty eight states will have been completed.

The SOUTH ATLANTIC STATES' ISSUE of 64 pages is the largest yet attempted by the editorial board of DISEASES OF THE CHEST. We trust that it will meet with the approval of our readers.

The Editorial Board of DISEASES OF THE CHEST, expresses its appreciation to the State Committees under whose direction this issue of DISEASES OF THE CHEST was compiled, and also to the officials of sanatoria, tuberculosis societies, and to all of the other individuals and agencies that cooperated to make this issue of DISEASES OF THE CHEST possible.

C. M. H.



## ASHEVILLE, NORTH CAROLINA

ASHEVILLE is proud of those pioneers in medical science whose sterling service in the treatment of tuberculosis brought deserved fame both to themselves and to this community where they ministered.

Several of these honored men have passed on. Their associates and co-workers still carry on and have upheld the high tradition, winning outstanding recognition from the profession for their valued contributions to the science of healing.

The environment of Asheville continues. Of course there has been improvement in transportation facilities, and a larger and more modern city has steadily developed. Asheville has the same setting in a beautiful plateau rimmed round by high ranges of tree-covered mountains. The city is still from 2200 to 3200 feet above sea level and enjoys a low humidity with mild winters and cool summers. The air is still screened by moisture-laden forests a mile high and more, and the water is still as soft and as pure as nature produces for any area.

There are numerous sanatoria, modernly equipped with trained staffs. There are skilled specialists in every department of pulmonary treatment. There is community sympathy and understanding.

The splendid Veteran's hospital at Oteen gives this section the stamp of federal approval. The new state hospital for tuberculosis cases, now nearing completion close to Asheville, is an endorsement of this locality by North Carolina.

This civic organization will be glad to send more detailed information upon request.

**CHAMBER OF COMMERCE**  
ASHEVILLE, N. C.

## SOUTH ATLANTIC STATES ISSUE

&gt;&gt;&gt;

## NORTH CAROLINA SECTION

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## FOREWORD:

This Section of Diseases of the Chest is North Carolina's contribution to the South Atlantic States Issue of the journal.

The committee has attempted to portray through words and by pictures, the facilities that North Carolina has provided for the care of the tuberculous.

It has not been possible in these few pages to tell of all of the work that is being done in North Carolina for the control of tuberculosis; but we are proud to present the pictures of our sanatoria and the interesting histories of those institutions.

The Asheville Section of Diseases of the Chest, is dedicated to the pioneers of **Tuberculosis Progress at Asheville**. . . It is the aim of the Editorial Committee to pay respect

to those great physicians, who have given unsparingly of their knowledge and of their energies, so that the scientific treatment of tuberculosis could be carried forward. . . and the pages that follow are but a small tribute to their valuable work. . . we are complimented, to be able to add our little bit, in commemoration of the Pioneers of Tuberculosis Progress at Asheville.

The Modern Sanatoria, whose pictures are shown in this section of the journal are proof that Asheville has kept in step with the present trend of the treatment of tuberculosis and other respiratory diseases.

The committee expresses its thanks to those who have assisted in making this issue of Diseases of the Chest possible.

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VIOLET HILL SANATORIUM

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FORSYTH COUNTY SANATORIUM-----P. A. YODER, M.D., Winston-Salem

# "ASHEVILLE'S PIONEER



**KARL VON RUCK, M.D.**  
1849 - 1918

BY

**EDW. W. SCHOENHEIT, M.D.**  
Asheville, N. C.

KARL VON RUCK was born in Constantinople, July 10, 1849, his father being in the Diplomatic Service at the time. His early life was spent in Stuttgart, Germany, and in spite of the wishes of his family that he enter the Diplomatic Service he studied medicine and graduated with the degree of doctor of medicine in 1877. He then came to the United States and received an M. D. degree from the University of Michigan in 1879. Following this he did post graduate work in Berlin with Virchow and Robert Koch. Dr. von Ruck was present at the memorable meeting of the Berlin Physiological Society, March 24, 1882 when Koch announced the discovery of the tubercle bacillus.

After some years practice in Ohio, Dr. von Ruck decided to limit his work to tuberculosis and, seeking a more favorable climate for a sanatorium, he located in Asheville and established the Winyah Sanatorium, the first private institution for the treatment of tuberculosis, in 1888. Being interested in scientific research and having a remarkably keen investigative mind, he felt that the control of tuberculosis would come through biological treatment and immunization of children. He founded the von Ruck Research Laboratory for Tuberculosis in 1895 and in 1897 introduced the watery extract of tubercle bacilli, a modification of Koch's first tuberculin, which was widely used in treat-

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**CHARLES LAUNCELOT MINOR, M.D.**  
1865 - 1928

BY

**PAUL H. RINGER, M.D.**  
Asheville, N. C.

DR. CHARLES LAUNCELOT MINOR was born May 10, 1865, in New York City. He attended the Episcopal High School in Alexandria, Virginia, and went from there to the University of Virginia, where he obtained the degree of M. D. in 1888. There followed a period of internship for two years in St. Luke's Hospital, New York. He was married in 1890 to Mary McDowell Venable, of Charlottesville, Virginia, and then went abroad for two years to study in Vienna under Weichselbaum, Kolisko and Friedrich Kraus. He also studied in Berlin, Munich, Paris and London and spent some time doing obstetrics at the Rotunda Hospital in Dublin. Returning to the United States in 1892, he settled in Washington and started to practice surgery. Developing tuberculosis in 1895, he moved to Asheville, where he convalesced and where, in 1897, he began the practice of the specialty that made him famous.

Soon, Dr. Minor was well known for his diagnostic and therapeutic abilities in the treatment of tuberculosis. One of the charter members of the National Tuberculosis Association, he became its president in 1918. Laying great stress not only upon the physical, but also upon the psychic management of tuberculosis, he propelled himself into the very front rank of phthisiotherapists. Fearless and fair, he loved nothing more than an animated discussion concerning any phase

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# TUBERCULOSIS PHYSICIANS''



**WILLIAM LeROY DUNN, M.D.**  
1871 - 1928

BY

**C. D. W. COLBY, M.D.**  
Asheville, N. C.

DR. DUNN was born at Fairfield, Ohio; March 31st, 1871; moved with his parents to Decatur, Ill., in 1879; was graduated from Decatur High School at the age of sixteen years. Soon after this he entered the Department of Pharmacy at the University of Michigan, and after finishing in pharmacy entered the Medical Department, finishing in 1891. But as he was not of age he remained there until his twenty-first birthday, assisting the Professor of Surgery, to secure his degree. Following this he took a year of post graduate work in pathology in Germany and Austria. Soon after his return from abroad Dr. Von Ruck induced him to come to Asheville to open and run the laboratories at his sanatorium (THE WINYAH). While employed in this capacity, Dr. Dunn brought out the antigen known as "Von Ruck's Watery Extract," which proved to be the best one ever produced.

Dr. Dunn's method of placing the patient at absolute bed rest on an open porch in the rarefied mountain air of Asheville, N. C., where he specialized in the treatment of the tuberculous for twenty-nine years, together with his knowledge and clear, unbiased understanding of human nature, won fame for him throughout North America and many foreign countries. This, with his service abroad during the World War, his part in

(Continued to page 24)



**CHASE P. AMBLER, M.D.**  
1865 - 1932

BY

**ARTHUR C. AMBLER, M.D.**  
Asheville, N. C.

Immediately upon graduation from Western Reserve University in 1889, DR. CHASE P. AMBLER became associated with Dr. Karl Von Ruck at the old Winyah Sanatorium. He severed this connection in 1896 to enter private practice and during the years following several young physicians got their start in tuberculosis work in his office. Among these were Dr. H. K. Porter, the late Dr. C. E. Reed, Dr. J. W. Huston, and Dr. Arthur C. Ambler. In 1900 he induced the Sisters of Mercy to open a sanatorium in Asheville and for many years looked upon St. Joseph's as his own institution. In 1924 he was elected president of the then formed medical staff of the enlarged institution and in 1930 was made honorary president for life. He was vitally interested in any movement promoting the health of the city and as early as 1903, when president of the Buncombe County Medical Society, began the fight for meat and milk inspection.

Dr. Ambler had always advocated this section as a health resort and claimed that its climate and scenery were its greatest assets. His life was peculiarly rich in that he was privileged to see his two dreams for Western North Carolina materialize in the official establishment in 1929 of the Smoky Mountain National Park and in the construction and operation of the Ambler Heights

(Continued to page 24)

# How Does Tuberculosis Heal?

SINCE its inception, DISEASES OF THE CHEST has constantly published articles detailing the methods of early

BY

C. H. COCKE, M.D., F.A.C.P.  
Asheville, N. C.

recognition or diagnosis of tuberculosis and the appropriate methods of treatment. These have been most helpful I am sure. It has seemed to me worth while, in the brief compass of this communication to take up the matter of the healing processes with no thought of the presentation of any new material, but as a matter of orderly review and perhaps of emphasis upon some phases of the subject possibly not entirely appreciated by all.

Several years ago the debate as to the relationship of allergy and immunity in tuberculosis was interesting, illuminating and provocative—unfortunately it has never been wholly conclusive. Whether one agrees with Krause that immunity is a function of allergy or with his critics, who oppose this view, is not of material consequence for this discussion. However, as recently succinctly stated by Pinner, I think all will agree that the two essentials apparently known with certainty of allergy in tuberculosis are: (1) "Allergy can be produced only by infection with (living or dead) tubercle bacilli; (2) Allergy accentuates and hastens the native tissue reactions against tubercle bacilli." Whether that means healing or progressive disease is too long a story to be dealt with here.

The specific tissue reactions to the tubercle bacillus are twofold, proliferative, from its fats and waxy capsule, and exudative or inflammatory, from its proteins. The latter is acquired from a primary infection whereas the former is inborn. There is no exudative reaction without tubercle; with it, the body will react with varying grades of inflammation depending upon the number of focalizing bacilli, or on their injected protein products, as well as the degree of specific hypersensitiveness (tissue allergy) present. I quote from a more extended discussion I recently made on this same subject:

"Primary nodular tubercle, the result of first infection, is quite leisurely in its development, while the exudative

reactions, which are only possible in allergic tissue, are always the result of reinfection, whether of endogenous or exogenous origin, and develop with considerable rapidity. Since primary tubercle sensitizes the body, it is shortly afterwards allergic itself; and its bacilli, when conveyed to fresh tissue, naturally lodge in allergic soil. This small nodule then epitomizes the pathology of the disease tuberculosis, for it goes through all the tissue reactions found in tuberculous processes of all kinds. Primarily and essentially a proliferative product, when it becomes allergic it may show exudative features, and go on even to central necrosis from cellular degeneration. While necrosis is happening centrally, fibrosis and repair may be going forward peripherally; and the issue in the case depends upon which predominates. This in turn is largely dependent upon the number of bacilli present in the center of the tubercle. The fewer in number they are, the more favorable the chance for fibrous encystment; the greater the number, the greater likelihood of necrotic extension, with migration of the bacilli to fresh soil and the development of new tubercle. Thus eventually conglomerate tubercles are formed. Multiplying this process many times, with a proliferative capsule still enveloping the whole, central necrosis and liquefaction may occur, and the well known cavity is present. So we see the unity of all tuberculous processes, which it was the glory of Laennec to appreciate, though naturally he could not know our modern concepts of pathogenesis—a cycle of four pathological processes: (1) proliferation, (2) exudation, (3) necrosis (caseation), and (4) fibrosis and repair.

"When one pauses to think of the enormous number of conglomerate tubercles that must form finally to cause clinical

disease, and that these are of every type, stage, and anatomical structure, the reason why the effect of tuberculo-protein constantly upon a lung harboring such tubercles is protean becomes quite apparent. Undoubtedly, herein lies the key to the sequence of progress and regress in the disease. One thing would seem established — that clinical tuberculosis is caused by tubercle going through allergic phases, and that these allergic reactions are continually going on in the lung, and consequently modifying pathological processes — some productive of symptoms, others apparently stimuli to healing. Both proliferative and exudative processes may be going on in the same lung concomitantly. Either may heal or progress."

Now what are the healing processes in tuberculosis? In ordinary infections, phagocytosis usually plays an important part in recovery; in tuberculosis, the polymorphonuclear leucocytes alone would seem to be unable to destroy the bacilli, though they may act as a means of transport to the lymph structures where cellular defenses arrest them. It does not matter what the portal of entry by which tubercle bacilli enter the body is, they are carried into the lymphatics, generally finding arrestment in the lymph nodes. Allergized tissue has been credited by some with the power of retarding the dissemination of bacilli, though Arnold Rich is emphatic in saying, "However, in all of the experiments, blood cultures, and microscopical studies made, it is perfectly clear that the immobilization of the bacteria in the immune, non allergic body was just as effective as it was in the allergic one" and "It is clear that the primary agent responsible for the local immobilization of bacteria is the immune antibody and not allergic inflammation." Zinnser, however, feels that while antibody formation undoubtedly takes place in tuberculosis, the part antibodies play in recovery is not only quite problematical, "but from many points of view unlikely."

One of nature's prime efforts at protection is the incapsulation of bacilli, first

in fibrotic, later in calcific tissue, the putting in jail, so to speak, of bad actors, allowing them no communication by vessel or channel spread to other structures or tissues. Repair by fibrous tissue formation in the periphery of the tuberculous lesion is nature's constant effort. This reaches enormous amounts so that sometimes the penalty paid for recovery is distortion of the trachea, diaphragm, heart, and mediastinum, with pulmonary shrinkage, and the end result—a crippling amount of disturbance of the respiratory and circulatory functions; while all too frequently bronchiectasis and emphysema are the sequels as well as the penalties the patient pays for not succumbing to his tuberculosis.

Sometimes you see a chest in which there is an enormous amount of healing by calcification. The explanation is not forthcoming, as it apparently can not be related to any present studies of blood calcium or to our knowledge of calcium metabolism. The genius who unravels the mystery of the parathyroids may some day give us a clue.

We now come to the most important and most beneficent process of healing in tuberculosis, namely resolution or resorption — an apparent, complete disappearance of what would seem to be a formidable amount of tuberculous pathology. This occurs of course only in the part of the process that partakes of an inflammatory nature, the exudative process so called. But how to differentiate with exactitude by either physical or roentgen examination the various elements in the so commonly mixed pathology of clinical tuberculosis is beyond the powers of most, for lesions commonly called fibrocaseous undergo at times astonishing amounts of resorption, while much that might most probably be called fibrosis disappears, doubtless in just the ratio that this fibrosis partakes of an inflammatory nature. This resolution or disappearance of the pathology in the lung might have been predicated from what all have seen of tuberculosis of the *peritoneum*, the

testicle, the eye, etc. It took the serial film, however, to prove to us just how large a factor in healing resolution is. Just what is its proportionate share in recovery of course is doubtless a matter of the pathology as well as the methods used to promote the cure, with which we are not concerned here. And while it cannot be controlled, I believe it may be influenced and encouraged by the sovereign method of bed rest, no matter what other agencies are used. A good rule to follow as to how long to keep up bed rest is that enunciated by Marriette some years ago—as long as the film shows continuance of regressive and absorptive changes.

What about the healing of cavities? Those having thin walls with little, fibrous elements are commonly seen to disappear completely under appropriate treatment, while thicker walled ones either may largely disappear or else be replaced with strands or bands of fibrous tissue connecting deposits of calcium or not as the case may be.

This discussion, admittedly unduly compressed though advisedly so, would not be complete if some mention were not made of the fact that there is a lack of parallelism between disappearing symptoms, receding signs, and altered radiographic findings. They are neither coincident, nor, when they are concomitant, is the degree of recession similar or of equal measure. Physical signs may frequently be heard in the chest long after symptoms referable to the lungs have ceased, and even after the film shows an almost if not totally vanished pathology. This probably means pathological changes remaining imperceptible in the film. Frequently marked radiographic evidence of the disease may persist without physical signs being obtainable; and to this add the puzzle that in this instance symptoms may or may not be present. In other words symptoms may persist

with silent pathology; physical signs of considerable number may be heard with no visible pathology in the film; and extensive pathology may be visible in the x-ray without either symptoms or signs. Under such conditions then I think one is warranted in concluding that the first criterion of healing is a symptom-free patient. Granted then that he has been such for a sufficiently long period under conditions of ordinary life, in which the radiographic findings have either disappeared or have remained stationary for some months, while the patient is physically active, it is fair to assume that he is healed, even in the presence of adventitious chest sounds. A saying that I am proud to repeat is that a patient suffers not from signs but from symptoms, which may be subjective or objective. Pulmonary symptoms are always of absolute importance, signs have a relative value, and must be evaluated in the light of all the evidence obtainable, including the symptoms. The x-ray is of inestimable value in the correct interpretation of any given case; but it is always well to remember that at its best it is but a register of densities, and its failures are doubtless more ours of interpretation than inherent in the film itself. The healed lesion then is one that has so thoroughly fibrosed or calcified that the imprisoned bacilli and their poisons are held incommunicado, and cannot reach other body structures or its fluids. Again, it is the exudative process which has either disappeared completely by resorption or resolution or partially so, and the unresolved portion has undergone fibrosis and calcification. The more recent the lesion, or in other words the greater its acuteness, the greater the likelihood of healing by resolution; while the more productive the lesion is, that is the more true fibrosis there is present, the less probability of marked resolution.

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## The Childhood Tuberculosis Problem

IN FORMER years it was believed that infants and young children rarely survived a tuberculous infection. Those in whom a diagnosis could be made by physical examination were so seriously affected that recovery was unusual.

The intradermal tuberculin test and the x-raying of the chest have furnished information that has changed our conception of childhood infection with tubercle bacilli. Today we believe that infants and young children have a natural power of resistance against the first invasion of the bacilli that probably equals the natural resistance possessed by the uninfected adult.

We have learned that our tissue response to the primary infection and the response to a subsequent infection differ radically; so much so that the clinical symptoms may help us to determine with which type of infection we are dealing.

In primary infections the bacilli apparently meet with little resistance from the tissues at the point of invasion and rapidly pass to the lymph nodes of the hilum and tracheobronchial area. In the first two or three years of life the bacilli may reach the bloodstream and be disseminated through the body. Other organs may become involved; a meningitis may develop, or there may be a general milinary tuberculosis, for, as Krause <sup>1</sup> has pointed out, both lymph vessels and nodes are more open in infancy than at any other period of life.

Reinfection meets with more resistance in the allergic tissues which tend to fix and localize the infection. While the fixing and localizing of reinfection may in a sense be of a protective nature, yet both the local and systemic effects are much more severe and destructive than are the effects of primary invasion.

We are now in the habit of referring to the primary infection as one of *benign* type, but in 1927 Boynton <sup>2</sup> reported that

BY  
J. W. HUSTON, M.D.  
Asheville, N. C.

from 1915 to 1926 tuberculous meningitis caused more deaths in Minnesota children under five years of age than any other disease; that 64 per cent of the deaths in children under one were due to tuberculous meningitis, and that pulmonary tuberculosis ranked next to tuberculous meningitis as the cause of death in children under five years of age.

Statistics tend to show a rapid lowering of the mortality rate from tuberculous infection in children, due chiefly to the rapid lowering of the mortality rate in adults, and doubtless also to the fact that an enlightened public now protects the child from known infection more often.

Promptly after the invasion of the tubercle bacilli into the lung parenchyma the entrance point is surrounded by an exudative or infiltrative area which may be demonstrated in films, but usually produces no physical signs.

The rapid invasion of the lymph nodes by way of the lymphatics leading from the parenchymal area results in caseation of the glands, but, until calcium deposits outline them, they produce no demonstrable shadows on the films unless they be of unusual size.

According to Watt <sup>3</sup> the deposit of calcium in the glands and parenchymal area may be delayed for from one to four years and, after the fading out of the parenchymal shadows, the films may show no pathology until the deposit of calcium replaces caseation.

The intradermal tuberculin test shows positive in three to six or eight weeks after infection and is accompanied by fever and increased sedimentation rate according to Barley <sup>4</sup>.

That the parenchymal involvement is not always of a truly benign type is shown in reports by Nalbaut <sup>5</sup> of children with pulmonary consolidations accompanied by corresponding lymph node in-

volvement. Tubercle bacilli were found in the gastric contents and faeces in a high percentage of these cases, one fourth of which were infants, but the greater portion of the group were between the ages of four and eleven. Nalbaut further states that bacilli were found in the gastric contents of children whose films showed little or no pathology, and he believes that such cases are a source of danger to other children.

Gourley <sup>6</sup> reports similiar findings and in addition found bacilli in the gastric contents of some cases in which there were calcium deposits in the regional lymph nodes.

Stewart <sup>7</sup> believes these pulmonary cases received massive infection and states, "There is a limit to which this natural resistance may be abused without being overcome."

Opposing views have been expressed as to the significance of the degree of reaction as shown by the tuberculin test. Masten <sup>8</sup> believes it simply registers positive or negative. Opie and McPhedran <sup>9</sup> say that a "Marked hypersensitiveness to tuberculin is of considerable significance." Myers <sup>10</sup> believes that markedly positive reactions indicate a recent infection, reinfection, or progressive disease.

The relation of allergy to immunity remains a controversial subject, but Stewart <sup>7</sup> expresses a view held by a number of writers. He says that the "Tendency of the primary infection is to prepare the soil for the development of the highly fatal adult type of tuberculosis." The positive reactors, therefore, enter the dangerous "teen" age sensitized, ready for reinfection which is so fatal to that age group. Myers estimates that the chances of the positive reacting child for contracting adult type tuberculosis are five times greater than those of the negative reacting child.

Are the reinfections that produce adult type infection of endogenous or exogenous source? That the child who is subjected to continuous close contact with open tuberculosis is repeatedly infected

and reinfected, causing either exacerbations in the primary form, or producing the adult type of infection, cannot be doubted.

Hendricks <sup>11</sup> states that there is "Steadily accumulating evidence that adult type of tuberculosis can, and does develop endogenously from the childhood type."

If the adult type infection is of frequent endogenous origin, then we must view the primary infection with increased concern, and give attention to any condition that may lower the child's resistance. Any sub-standard condition should be remedied promptly. Corrections should be made of faulty habits of diet which produce deficiencies that inhibit normal growth and development.

We should remember that overexertion in the child may have the same possibilities of causing auto-inoculation from his unhealed infection that ill-timed exercise may have on the adult with an active lesion.

The usual survey of tuberculin testing and x-raying of children in school clinics by health departments provides the community with a report, and leaves the problem of the infected child up to the parents and their physicians.

Are we taking the problem seriously, or have we minimized the dangers, possibly applying a stethoscope, looking for rales where none should be expected, measuring and weighing the child, and then pronouncing him well? From these children the recruits for the ranks of the tuberculous will be drawn. No campaign to eradicate tuberculosis will ever succeed that overlooks childhood tuberculosis.

This problem calls for management by the family physician. It is not to be solved by hospitalization, but by wise supervision of the growing child; protecting him from reinfection; the overtaking of his strength; the lowering of his resistance by infectious diseases. When we are able to remove the tuberculous adult from the home and place him under specialized treatment, and at the same time protect the primary case in the home, we shall succeed in conquering tuberculosis.

No progress can be made in the management of the infected child without the cooperation of the parents. They must have some understanding of the problem that concerns their children, and a practical demonstration seems the most logical method of education.

In Asheville, North Carolina, a movement has been launched which is believed to be of practical, and educational value to the community. A local civic organization has built and assumed the management of a small sixteen bed preventorium where, during the school vacation period, two groups of children are taken, each for a period of six weeks.

The City and County Health Departments, working in conjunction with the Preventorium Group, so time their annual clinics that reports reach the parents before the close of the school year. Parents of positive reactors, presenting the signed approval of the family physician, make application for the child's entrance to the preventorium. School nurses investigate each case and selections are made, preference being given to those who have known contacts in the home, and whose parents appear inclined to be cooperative.

During the major portion of their stay the children are kept at bed rest. Entertainment is provided and instruction pertaining to hygiene given by the nurses in charge.

Only children with primary infections are admitted to the preventorium. Reinfection cases and those with a cough are referred for sanatorium care. Most of the children cared for in the preventorium have had a low grade fever, and the majority have been somewhat underweight.

The average gain in weight of the 48 children was 6.1 pounds per child for the six weeks period. Some of the children lost their temperature during their stay and in other cases the parents, encouraged, continued the child's bed-rest in the home. All were supposed to continue a rest period in the middle of the day, and we have reason to believe that this has been carried out in most cases.

Nearly all of the children returned to school although a few were kept out and at rest because we believed their condition warranted a more prolonged rest. Reports from the schools are that these preventorium children have lost less time due to illness than formerly, and that in some cases the teachers reported improvement mentally as well as physically.

In addition to those cared for in the preventorium, numbers of private cases have been cared for in the homes. Applicants for admittance continue to exceed the number that can be cared for at the preventorium. As interest grows the school clinics increase in size. Of the 5,000 tuberculin tested in three season clinics more than 2,200 were in this season's clinic.

The brief experience of these clinics scarcely warrants any dealing in statistics, but a few impressions have been gained.

*First*, infection of our children has been received in the homes. The percentage of positive reactors found in the first grade remains but little changed through several grades.

*Second*, no exudative shadows of the parenchymal invasion have been found in the school clinics. Apparently infection took place and the shadow disappeared during pre-school age.

*Third*, the degree of reaction to tuberculin is of significance. Practically without exception those with demonstrable lesions were sharp reactors.

*Fourth*, those who are sharp reactors and who have no demonstrable lesions, should be more carefully watched than those with calcification of nodes. Tuberculin reaction is the evidence of infection; calcification is the evidence of repair work.

*Fifth*, no lengthy hospitalization of the average primary infection is indicated. However, it is important that the child subjected to continuous infection should be separated from the contact, or rather, that the open adult case should be hospitalized.

(Continued to page 28)

# Sterilization of the Air in the Operating Room With Bactericidal Radiant Energy

BECAUSE of recurring infections with the staphylococcus aureus in clean thoracoplasty wounds, an extensive bacteriologic survey of the operating room technique in the Duke Hospital was conducted during 1932 and 1933. This proved to our satisfaction that the majority of the infections occurred as a result of the contamination of the sterile supplies and open wounds with pathogenic bacteria which were always floating in the air of the occupied operating room in large numbers. The air in the vicinity of human beings could not be freed of pathogenic bacteria by any method which we tried. These methods included (1) masking of all occupants at all times, (2) reduction of the number of occupants to the minimum necessary for the operation, (3) in so far as possible, a reduction of the duration of occupancy before major operations, (4) ventilating the room with large quantities of clean air, (5) elimination of all persistent carriers, (6) daily washing of the floors and walls and frequent painting of the walls and ceiling, and (7) elimination of air currents from other occupied parts of the hospital. By these measures there was an appreciable reduction in the number of bacteria in the air, but not enough to avoid an occasional infection.

There were still peaks of air contamination associated with epidemics of respiratory infections which we were unable to control. During these peaks the danger of a wound infection was much greater than when the contamination was low. In general, the contamination was lower in the summer than in the winter and spring. We availed ourselves of this variation by postponing extrapleural thoracoplasties until the summer months in those cases where a delay was not detrimental to the patient.

Even with these precautions there was an occasional infection. In further at-

BY  
DERYL HART, M.D.  
Duke Hospital,  
Durham, N. C.

tempting to eliminate the pathogenic bacteria from the air we turned to radiations in the ultra violet range of the spectrum known to have bactericidal properties. The cooperation of the Lamp Division of the Westinghouse Electric and Manufacturing Company was obtained. They designed and constructed radiation tubes to give the maximum bactericidal radiation and the minimal burning effect. An operating room was equipped with eight of these tubes as shown in the illustration. Various bacteria were sprayed on petri dishes of blood agar and exposed to the radiation at a distance of five feet (the approximate position of the operative incision). Over 99.5 per cent of the bacteria could be killed within from one to five minutes of exposure, the time varying with the density of the inoculation.

A blond individual, exposed to the radiation at the same distance for 80 minutes, received only a reddening of the exposed skin (abdomen) with a prickly sensation which disappeared within 24 hours. Skin, muscle, fat and abdominal viscera of animals were exposed to the radiation at a distance of five feet for as long as 90 minutes, with no appreciable burn. In fact healing seemed to be somewhat better than in the control incision.

The operating room personnel was protected from the radiation by various combinations of goggles, glasses, eyeshades, sun helmets, hoods of starched cloth or rubberized silk with a watch crystal window for vision, and suction for adequate ventilation.

Operations on patients were most satisfactory from the start. Unexplained infections were practically eliminated, the postoperative temperature elevation was lower and the duration was shortened. The general postoperative reaction of the patient was greatly improved and there

(Continued to page 28)

## ASHEVILLE, THE CITY

BY

JOHN D. TOPPING

A climate admirably adapted to the treatment of tuberculosis, a setting amid some of the most beautiful scenery in the world, and a location midway between the Atlantic Ocean and the Mississippi River, midway between the Gulf of Mexico and Canada and therefore within a medium to short travelling distance from all sections of the eastern half of the United States, are factors which have combined to make Asheville, North Carolina one of the most noted and popular health resorts of the world.

The climate is blessed with a low humidity without the disadvantage of aridity and while Asheville's climate is mild it is not enervating. Sufficient variation exists to make it invigorating.

Grouped in this area are some of the most famous scenic attractions of America. Within a short motoring distance from Asheville are Mount Mitchell, highest mountain in eastern America, the famous monolith of Chimney Rock perched on its mountain slope a thousand feet above the blue waters of Lake Lure; the 440,000-acre national playground of the Great Smoky Mountains National Park, region of superb scenic beauty and leading national park of the United States in point of visitor-travel.

Grouped also among famous scenic points of interest in this region are: Mount Pisgah climbed by three motor roads from Asheville; the Sapphire Country region of granite-sided mountains and clear waterfalls; and the noted Blowing Rock and Linville Gorge region. In Asheville is the famous Biltmore House and estate, now open to public view and visited by thousands annually as one of the world's finest private homes and estates.

Amid scenic beauty such as is offered in Western North Carolina the patient suffering from tuberculosis sojourns in an atmosphere made serene and restful by the gentle loveliness of these inspiring heights.

Historically, Asheville (now a city of over 50,000 inhabitants) has been a famous resort and health center for the better part of a century. Development of the health facilities and particularly those sanatoria and facilities for the treatment of tuberculosis, began many years ago under the direction of a famous group of physicians who specialized in the treatment of this particular disease. Though many of these older men have since passed on, their successors, trained in the methods of the master technicians have carried on the work and have become nationally noted in their own right.

In the twenty-five or more sanatoria exclusive of state and federal institutions in this territory, the section offers an equipment to care for 900 tuberculous patients and 600 patients suffering from nervous disorders or non-tuberculous cases. Through long experience the private sanatoria are well equipped and expertly staffed.



# "Asheville's Modern Sanatoria"



## STAFF

DR. C. H. COCKE  
DR. A. B. CRADDOCK  
DR. S. L. CROW  
DR. JOSEPH B. GREENE  
DR. J. W. HUSTON  
DR. C. C. ORR  
DR. WILSON PENDLETON  
DR. PAUL H. RINGER  
DR. M. L. STEVENS

## AMBLER HEIGHTS SANITARIUM

ARTHUR C. AMBLER, M.D., President

ASHEVILLE, N. C.

## CRAGMONT SANATORIUM

BLACK MOUNTAIN

BY

I. J. ARCHER, M.D.

MEDICAL DIRECTOR

Located in the foothills of the towering Craggy Mountains, overlooking the beautiful Swannanoa Valley, in an estate of two hundred acres, Cragmont is just off the Black Mountain Highway, which is known as the "Main Street of North Carolina". It is five minutes from the Black Mountain Southern Railway Station, and twenty-five minutes from Asheville.

The building is especially designed and situated so as to secure every advantage of sunlight and mountain views.

The rooms have double French doors opening on to spacious covered verandas so that the patient may have the bed moved from room to porch whenever desired. The building is steam heated and has all modern conveniences.

Fresh vegetables in abundance and wide variety are grown on our own farm and rich milk comes from our dairy herd. The meals are appetizing and



nourishing and are scientifically planned. The water supply comes from a protected mountain spring piped to the building, and is of exceptional purity.

The nurses, dietitian, and servants are well trained and their cheerfulness is in keeping with the home-like atmosphere of contentment and happiness.

At Cragmont the patients are seen daily by the physician. The equipment includes X-Ray, Pneumothorax equipment, lamp for light treatment and a laboratory with a skilled technician.

Dr. M. L. Stephens, is the consulting physician.

# "Asheville's Modern Sanatoria"

## HILLCROFT SANATORIUM

BILTMORE STATION  
ASHEVILLE,  
N. C.

BY

ANNIE L. RUTHERFORD, R.N.  
SUPERINTENDENT



This private sanatorium, established 1919, is well equipped and managed for the treatment and care of patients with tuberculosis. It is located in the suburbs of Asheville, with well kept grounds surrounding the main building and two cottages. On all sides are restful views of surrounding mountains.

Graduate nurses who have had many years of experience with all forms of tuberculosis are in attendance at all times. Patients are given the highest possible quality of service, food, and treatment at rates exceptionally low for this type of sanatorium.

## SUNSET HEIGHTS SANATORIUM

BY

MINNIE GIBBS, R.N.

SUPERINTENDENT



The Sanatorium is located on the side of Sunset Mountain, Asheville, at an altitude of 2,500 feet. Commands a beautiful view of the city and mountain range beyond. Quiet surroundings, but only a short distance from shopping center and churches. There are four and one-half acres of grounds, with walks among beautiful, well-kept flower beds.

All rooms in main building have private porches and many have private or connecting bath. There are also community porches with southern exposure, glassed in for the winter. Insulated for maximum comfort in summer and winter.

The four cottages, each accommodating five patients, are equipped with baths and

hot water heat, and all have congenial and home-like atmosphere. The main building has room for 14, making total accommodations for 34.

Each patient selects his own physician. Sunset Heights is under the patronage of physicians who specialize in tuberculosis and are noted for their skill and modern methods in such treatment.

Careful attention to diet, with skilled nurses in charge.

# "Asheville's Modern Sanatoria"



## VIOLET HILL SANATORIUM

BY  
MRS. FLORENCE BARTH  
OWNER

On an elevation chosen for its scenic magnificance, Violet Hill looks out on views of rare splendor. The location of the sanatorium is a carefully developed beauty spot of 11 acres; just far enough from the city to be completely free from noises and disturbances of all kinds.

Violet Hill Sanatorium was built in 1923 to take the place of "The Pines", which had existed for 22 years.

The buildings are new and modernly equipped, and can accommodate 37 patients. Each room has a sleeping porch with southern exposure, dressing rooms are steam heated, all beds newly equipped with Beauty Rest mattresses, and the baths are roomy and comfortable.

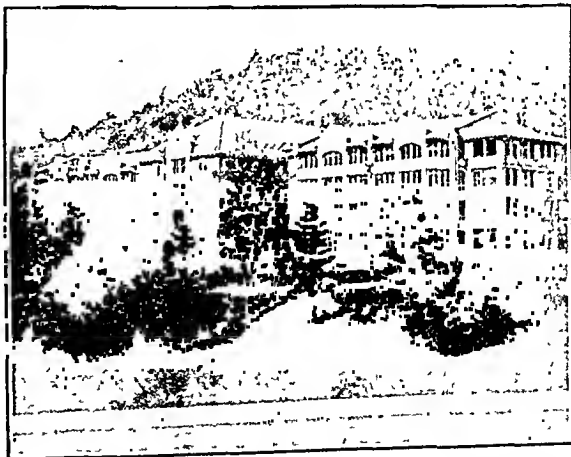
Graduate nurses are employed, careful attention is given to correct diets, and the sanatorium is open to all registered physicians.

## SAINT JOSEPH SANATORIUM

BY  
SISTER ELIZABETH  
SUPERINTENDENT

St. Joseph Sanatorium was established by the Sisters of Mercy in 1900, in Western North Carolina, in Asheville, "the Land of the Sky". The first building occupied by them was on French Broad Avenue. The number of patients seeking admission to the institution, however, so far exceeded the accommodations, that expansion became a necessity. Accordingly, in 1909 the present location on Biltmore Avenue was purchased, and the south wing of the present building was erected in 1917. To this in 1924 was added the administration building and the north wing.

Located in a section of Asheville known as Forest Hill, with a wide sweeping lawn, ornamented with magnificent trees



and shrubbery, the sanatorium is one of the show places of the city. It is sufficiently distant from the busy traffic to provide rest and quiet for the patients. The building is fireproof and supplied with the most modern equipment. The medical staff is composed of leading tuberculosis specialists. The patients receive the benefit of strictly scientific and individual treatment. Each department is under the direct supervision of a registered Sister nurse and a staff of graduate nurses. A homelike atmosphere is maintained at the Sanatorium.

## "Asheville's Modern Sanatoria"

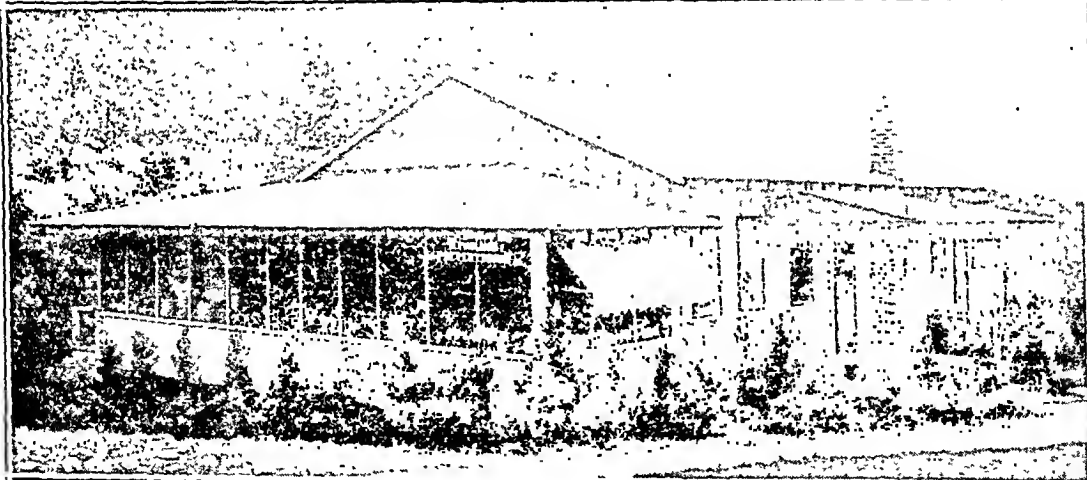


### ZEPHYR HILL SANATORIUM

BY  
MRS. WALTER I. ABERNETHY, R.N.  
SUPERINTENDENT

Established in 1920 by Drs. Chas. Hartwell Cocke and J. W. Huston for the treatment and care of pulmonary diseases, Zephyr Hill has been in continuous successful operation for seventeen years.

Under the ownership and management of Mr. and Mrs. Walter I. Abernethy, the building has been modernized and enlarged to accommodate thirty patients. Zephyr Hill has every necessary facility, including a fluoroscope and special treatment room for the administration of artificial pneumothorax, throat treatments, etc. Drs. Cocke and Huston are the medical directors of the sanatorium.



### KIWANIS PREVENTORIUM

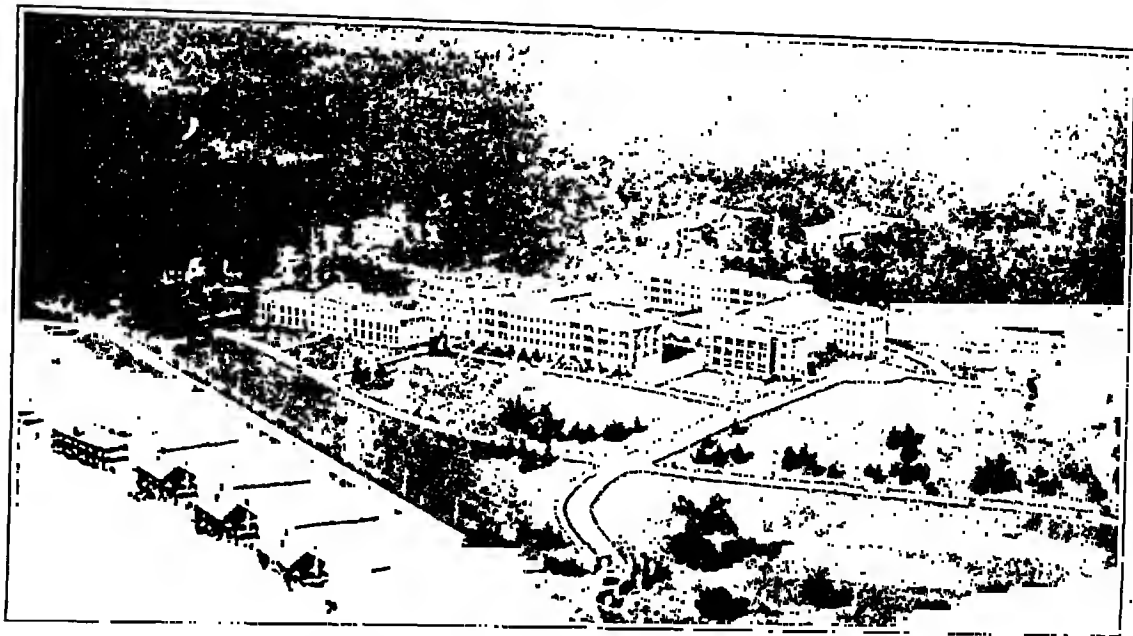
BY  
JOHN WALTER HUSTON, M.D.  
MEDICAL DIRECTOR

The Preventorium was built in the spring of 1935, by the Asheville Kiwanis Club, on a five acre tract adjoining the Zephyr Hill Sanatorium.

The project was launched by donations from members of the Kiwanis Club and other interested individuals. Various organizations and business concerns made contributions of supplies and money for the endowment of beds. One dairy supplied each child with a quart of certified milk daily. The Parent-Teachers

Associations cooperated in the Christmas seal sale to provide operating funds.

The children form a happy group. Their average gain in weight has been six pounds for six weeks; the maximum gain was fourteen pounds. Community interest grows and Dr. J. W. Williams of the City Board of Health says: "It is something the community can see; it is a demonstration of what can be done with potential cases."



## VETERAN'S ADMINISTRATION FACILITY OTEEN, NORTH CAROLINA

BY

I. R. WAGNER, M.D., MANAGER

Prior to the beginning of the World War, Asheville and its vicinity had already acquired a considerable reputation as a center for the treatment of tuberculosis in its various forms, and it was only natural that when the World War broke out this locality should receive favorable consideration for the establishment of an Army Hospital, especially after it became evident that many soldiers required treatment for pulmonary tuberculosis. Accordingly, the present site of Oteen was selected and O'Reilly General Hospital was established and rapidly developed into an institution comprising approximately 3000 beds, the majority of which were desired for the care of the tuberculous.

The site selected was a tract of about 337 acres, located seven miles east of the city of Asheville, on the Swannanoa River, where railroad facilities were available within a distance of about one mile. The hospital was first referred to as the Azalea Hospital, but this was later changed to Oteen, a Cherokee Indian word of doubtful meaning. It is apparently just an Indian name, although it seems that the name may have been used by the Cherokees as referring to the area surrounding the present site of the hospital.

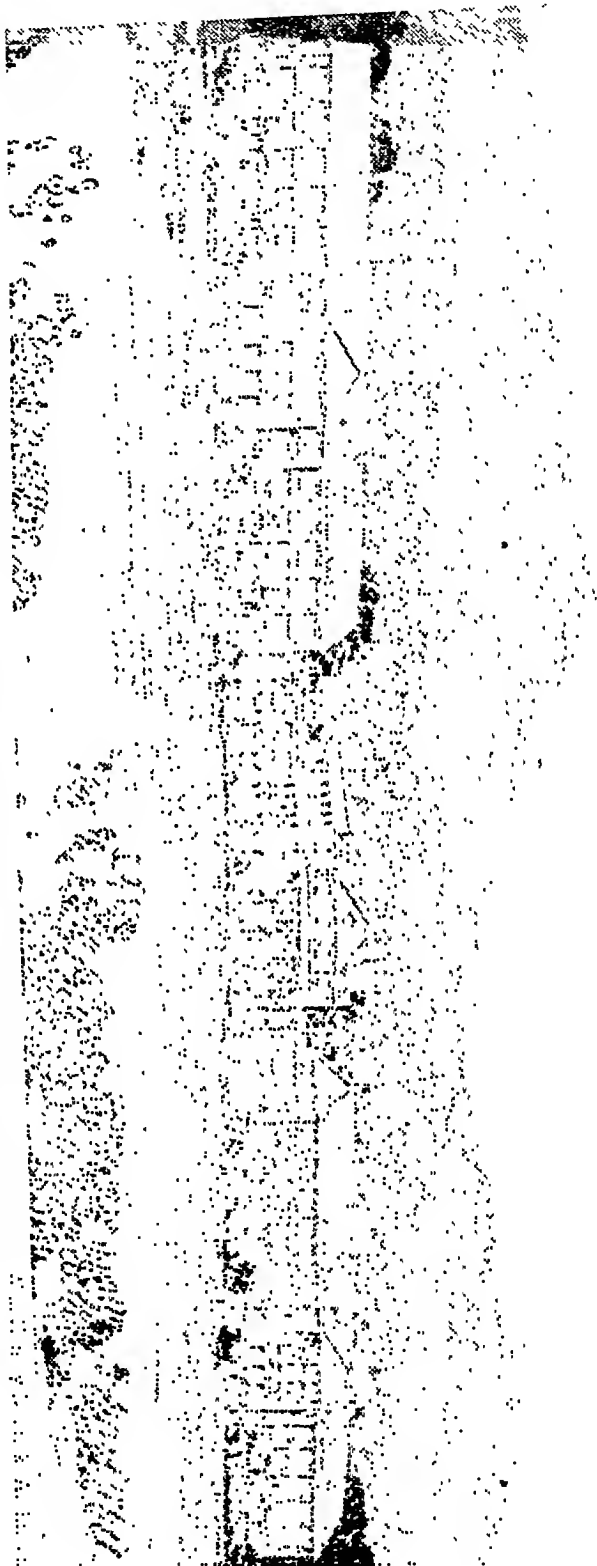
During the war this developed into a very large hospital, at one time there being approximately 3000 patients treated

in frame buildings of about 40 bed capacity each and scattered around a central Administration Building. It was at that time under the direction of qualified Army Officers, many of whom had already specialized in the treatment of tuberculosis. It was successful in its treatment from the very beginning and by the end of the war had already acquired a reputation as a hospital fully equipped for the successful treatment of this disease. It was natural, therefore, that after it had served the purpose of the Army, that the Public Health Service, which was then charged with the care of the sick ex-soldier, would avail itself of the fine equipment at Oteen, and continue to use it for the care of the cases of tuberculosis committed to their charge.

Under the direction of the Public Health Service, Oteen successfully treated tuberculosis in the ex-soldier until it was finally turned over to the Veterans Bureau, October 16, 1920, and during this time thousands of patients were treated there, as many as 1300 being registered at one time. The hospital was manned by officers under the direction of the Surgeon General, U. S. Public Health Service.

On October 16, 1920, the Public Health Service surrendered the jurisdiction of all hospitals for the treatment of ex-soldiers to the U. S. Veterans' Bureau, and such

(Continued to page 26)



Building under construction.

## Western North Carolina State Tuberculosis Sanatorium

BY  
**P. P. MCCAIN, M.D., SUPERINTENDENT**

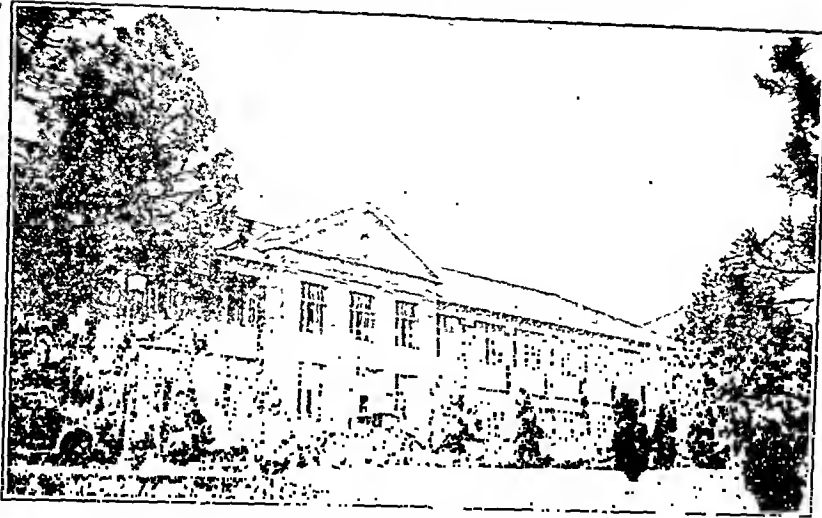
During 1933 and 1934 there was considerable agitation for the establishment of another state sanatorium in Western North Carolina. The movement was given considerable impetus by the hearty endorsement of the State and District Medical Societies. In 1935, Representative E. A. Rasberry introduced a bill calling for an appropriation of \$500,000 for the establishment of the Western North Carolina Sanatorium. The bill was championed by Mr. L. L. Graveley and through their joint efforts the bill was passed with an appropriation of \$360,000 which was supplemented by a P. W. A. grant of \$245,000.

Both institutions were placed under the management of a new Board of Directors with Senator L. L. Graveley as Chairman. A specially appointed committee chose one of the most beautiful sites in America for the location of the sanatorium near Asheville and Black Mountain. The Board appointed Dr. P. P. McCain as General Superintendent for both institutions and Dr. S. M. Blithner as Associate Superintendent to be in immediate charge of the Western North Carolina Sanatorium. The new institution is planned eventually to care for 400 patients. The patients, are now nearing completion and it is hoped

that the institution will be ready to receive patients sometime during the summer.

The legislature of 1937 through the efforts of Senator Graveley passed an amendment to the Social Security Bill providing \$137,500 for another wing, which will accommodate 165 additional patients, this appropriation being conditional on securing a supplementary P. W. A. grant of \$112,500. The additional beds and the number of available beds for tuberculosis patients in the state to 1,783, which is practically one bed per annual death from tuberculosis.

# North Carolina Sanatoria



(Women's Building)

## NORTH CAROLINA STATE SANATORIUM

P. P. McCAIN, M.D., SUPERINTENDENT

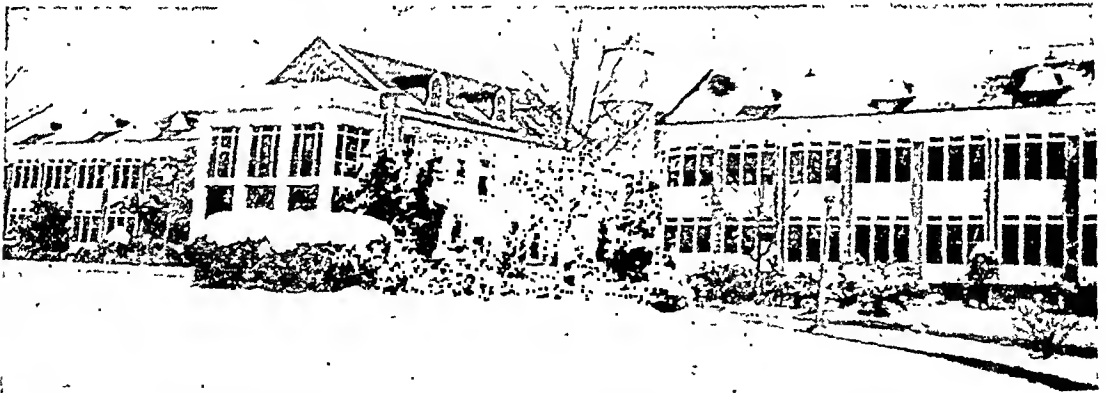
The North Carolina Sanatorium owes its birth to Dr. J. E. Brooks, a promising young physician of Greensboro, N. C. In 1907 he was instrumental in securing an appropriation of \$15,000 for the purchase of a site and for the erection of a building, and \$5,000 for maintenance of the North Carolina Sanatorium. A beautiful site of a thousand acres was selected near Southern Pines and Pinehurst in the Sandhill Section of the state. The first small building was opened in 1909 with Dr. Brooks as its first superintendent. After many financial difficulties, Dr. Brooks resigned and the institution was temporarily closed in 1913.

During a special session of the Legislature in 1913

the management of the institution was transferred to the State Board of Health. The staff was again re-organized in 1914 with Dr. L. B. McBrayer as Superintendent and Director of the Bureau of Tuberculosis. Under Dr. McBrayer's wise leadership the institution gradually received the hearty support both of the medical fraternity and the public and it began a steady growth.

In 1924 Dr. McBrayer resigned and Dr. McCain was elected as Superintendent and Medical Director with Dr. S. M. Bittinger as Assistant Superintendent and Associate Medical Director.

The institution now has 485 beds and additions are now under construction which will increase the capacity to 550.



(Main Building)

## GUILFORD COUNTY SANATORIUM

JAMESTOWN, N. C.

M. D. BONNER, M.D., MEDICAL DIRECTOR

The institution is situated on a 150 acre plot in the Jamestown district on North Carolina Highway No. 10 between Greensboro and High Point. The main building with a capacity of seventy beds for white patients was opened in January, 1924, with Dr. Jos. L. Spruill as Superintendent and Medical Director, in which capacity he served until his death in 1934. During this period a preventorium with a capacity of 30 beds, a nurses' home capable of housing 15 nurses, and a colored division with a capacity of 11

beds were added. In the past year 46 beds for adults have been added, bringing the total to 128, of which 82 are for white patients, and 46 for colored. The children's building has been closed and made into a permanent nurses' home.

The institution is governed by a Board of Directors, appointed by the County Commissioners. They are as follows: Mr. Julius W. Cone, Chairman, Dr. W. L. Jackson, Mrs. Frank A. Sharpe, Dr. J. V. Dick, Dr. R. M. Bule, and Mr. Chas. L. Amos.

# North Carolina Sanatoria



## MECKLENBURG COUNTY SANATORIUM

HUNTERSVILLE, N. C.

BY

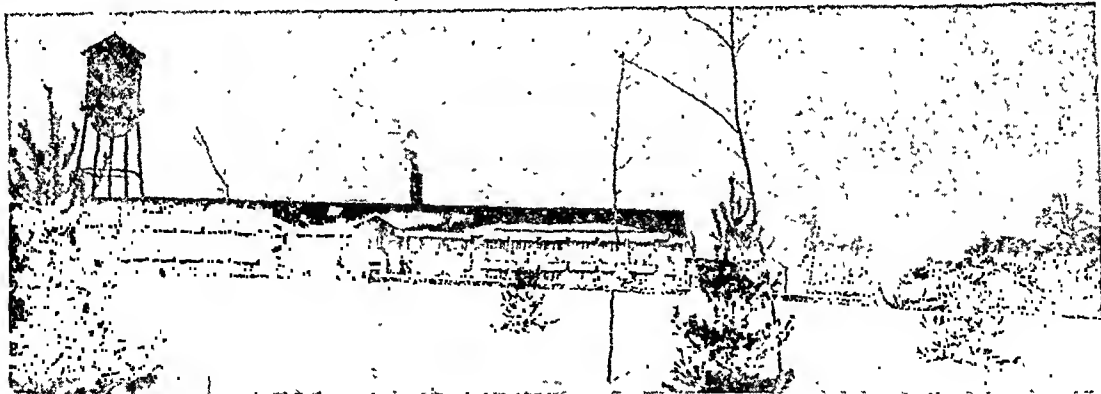
THOS. D. SPARROW, M. D.

CHARLOTTE, N. C.

In 1911 the North Carolina Medical College, then located in Charlotte, N. C., opened an out-patient clinic for the study and treatment of tuberculosis. The number of patients attending this clinic increased so rapidly and so many patients in the

acute stages of tuberculosis were encountered that it was obvious to those in charge that a hospital in Mecklenburg County, devoted to the treatment of tuberculosis, was an urgent necessity.

(Continued to page 26)



## FORSYTH COUNTY SANATORIUM

WINSTON-SALEM, N. C.

BY

P. A. YODER, M.D., SUPERINTENDENT

In 1917, the first county institution for tuberculosis in North Carolina, the Forsyth County Sanatorium, was founded. It was rebuilt and enlarged in 1929 and now has a capacity of 134 beds, of which 38 are for negroes.

The sanatorium maintains an outpatient

diagnostic and follow-up clinic in which 923 patients were examined and x-rayed last year.

The institution is owned and operated by the County of Forsyth on appropriations from the county commissioners and fees from patients, where their financial conditions permit.

**KARL VON RUCK** (Continued from page 6)

ment, and in 1912 he brought out a vaccine consisting of protein and lipid extracts of tubercle bacilli which was used in treatment and with which he hoped to immunize children. Many years of research were spent in his laboratories hoping to perfect an immunizing preparation which would stamp out the disease.

Dr. von Ruck founded and edited the first medical periodical devoted to tuberculosis, *THE JOURNAL OF TUBERCULOSIS*, which was published in Asheville. Being an earnest and untiring student he collected and maintained one of the finest private libraries in the country. All important articles on tuberculosis were abstracted and over 150,000 cards were filed in a fire proof vault. He contributed extensively to the medical literature in this country and abroad, and his book, *STUDIES IN IMMUNIZATION IN TUBERCULOSIS*, published in collaboration with his son Dr. Silvio von Ruck, in 1916, represented observations of several thousand patients and many thousand animals.

About 1910 Dr. Silvio became medical director of the Winyah and built up an enviable reputation for himself. Dr. Karl, during this period, became more interested in research and although he was a very able clinician, in addition to research, did consultation work only.

However, when Dr. Silvio came to his untimely death from pneumonia in 1918, though broken in spirit, due to the loss of his son and only grandchild, Miss Silvia, both from pneumonia, and his wife in 1921 from paralysis agitans, Dr. Karl again became active head of the Winyah. Fighting desperately against the inroads of chronic nephritis and hypertension he continued to work until three weeks before his death, though urged by his physicians to retire.

Thus on November 5, 1922, there passed away one of the great pioneers in tuberculosis, one of the outstanding figures in the history of tuberculosis in America. A student of Felix von Niemeyer, one of the greatest clinicians in the pre-bacterial era, he at first refused to accept the theories of infections and the demonstration of Villemin, however, his studies in Koch's laboratory so impressed him that he became one of the greatest students and investigators in infection and immunity in tuberculosis. A hard worker he seldom took a vacation and cared little for recreation, but was an accomplished musician and collected many rare flowering plants, especially orchids. Of strong convictions, he was often intolerant of those whose views differed from his, which often kept him from making friends. However, those who

knew him well loved him and though at times he may have seemed harsh, no kinder man ever lived.

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**CHARLES L. MINOR** (Continued from page 6)

of the specialty to which he had devoted himself. Definitely opinionated and quick at repartee, he held his ground undaunted; but whenever convinced that he was in error, he was the first to admit it and to bow the knee to scientific proof.

Honors were showered upon him. The presidency of the National Tuberculosis Association has already been mentioned. Prior to that bestowal, he became president of the American Clinical and Climatological Association in 1913, and in 1924 became president of the Southern Medical Association. He was a member of the Association of American Physicians, a signal honor, for that organization is almost wholly composed of physicians having leading positions in medical schools. In 1925, the University of North Carolina conferred upon him the honorary degree of LL.D.

A life well-rounded, well-spent, in every sense well worth while, enriched by many priceless friendships (for loving, he was beloved), came to a close as a result of coronary disease on December 26, 1928.

Surveying his span of 63 years, one is reminded of Mark Anthony's comment on Brutus:

"His life was gentle, and the elements so mixed in him that Nature might stand up and say to all the world, 'this was a man!'"

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**WILLIAM LeROY DUNN** (Continued from page 7)

the establishment of the Army Diagnostic Center at Washington, D. C., and his service for the veterans as Consultant to the Veteran's Bureau, built for him a memorial which will live through generations. His memory is dear to many thousands of "cures".

At his death, on May 24, 1928, at the United States Diagnostic Center, the world lost its highest authority on the chemistry of the tubercle bacillus.

— : : : —

**CHASE AMBLER** (Continued from page 7)

Sanitarium. For the one, he began working in 1899, and in the other he provided what he considered the ideal environment for the convalescent tuberculous patient. His last case history, written in October, 1931 after confinement to his home, closed a professional career which has brought prolonged life and renewed hope to thousands whom he had personally known and, through his contributions to the profession, made brighter the future of countless others.

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OTEEN (Continued from page 20).

jurisdiction has been maintained by the Veterans' Administration ever since.

The original hospital was all frame construction, all buildings being of a temporary character, and these in the course of time reached such a condition of repair that it became necessary to replace them with modern substantial buildings. This process of change was begun about 1923, with the construction of two permanent cement buildings of 130 capacity. These were later supplemented, at intervals, by the construction of a large Administration Building, in which there are in addition to x-ray and Clinical Laboratories, EEN&T Department, Surgical Department, Physiotherapy Department and Neuro-psychiatric Department, 150 beds available for special tuberculosis and general medical cases. Later, at intervals, four other large buildings were constructed for the care of patients, approximating 380 beds. These are all connected up by cement runways for the proper movement of patients and supplies. All utility buildings and commissaries, formerly of frame construction, have been replaced by modern cement structures, so that at present Oteen has a 850 bed capacity, with complete facilities for the proper care of this number of patients in modern fireproof buildings of late construction, equaled by no other institution in this part of the country.

A circulating library of approximately 10,000 volumes is available for patients and personnel, the wards being visited by the librarian and assistant librarians regularly, with books on carts for the ex-

change of books, the librarians giving advice to the patients for the selection of proper literature.

For ambulant patients a Recreation Hall is maintained, under the direction of a Recreational Aide, in which standard movie films are shown twice weekly, and where entertainment by outside organizations is frequently furnished. Every bed in the hospital is equipped with a radio headset and programs are available during waking hours.

The Dietetic Department is maintained under separate direction, the menus being arranged by trained dietitians, due to the dietetic requirements of the sick, while the cuisine, which is noted for its excellence, is also prepared under the immediate supervision of the dietitians, with service in the main dining room and individual tray service direct from the wards for patients unable to attend meals at the main dining room. Special diets, of course, are prepared for the seriously ill. Supplies are purchased under the strictest possible specifications prepared by the Veterans' Administration in Washington. Cooking is done by electricity and all buildings on the grounds are heated from a central station.

Located as it is in the beautiful mountains of North Carolina, with a climate surpassed by none in the United States, with its modern buildings, modern equipment, thoroughly qualified staff of physicians and other personnel, Oteen is equipped to render modern treatment to all patients received at its doors.

MECKLENBURG (Continued from page 23)

In 1921 the Mecklenburg Tuberculosis Association was organized. It was the purpose of this association to secure a hospital in the county for the treatment of tuberculosis. Their efforts were rewarded three years later when, in 1925, the Board of County Commissioners sanctioned an election for the authorization of a bond issue for the purpose of building a tuberculosis sanatorium. As a result of this election, bonds in the sum of \$100,000 were issued and on September 7, 1926 the Mecklenburg Sanatorium was officially opened. The institution has a capacity of 170 beds; 104 of which are for white adults; 26 for colored adults and 40 for white children. There is no provision for the treatment of colored children. The plant is located on a one hundred and ten acre tract about twelve miles from Charlotte, N. C. on the outskirts of the town of Huntersville.

Dr. John Donnelly was appointed superintendent of the institution when it was founded and remained its chief medical officer until 1937. At that time he was succeeded by Dr. H. L. Seay who is the present superintendent and medical director.

At the present time there is a waiting list for admission to the institution. No cases are refused admission except for lack of space. Since its opening, there have been admitted 920 white adults; 440 colored adults and 229 white children. The hospital is doing an excellent work but, like most similar institutions, needs more equipment and more funds for maintenance. It stands as a safeguard to the health of the citizens of the country; a godsend to hundreds of the community's sick and a monument to a progressive few who saw a vision to which they were faithful.

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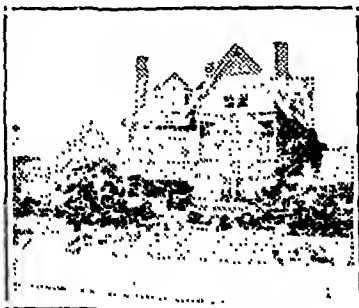
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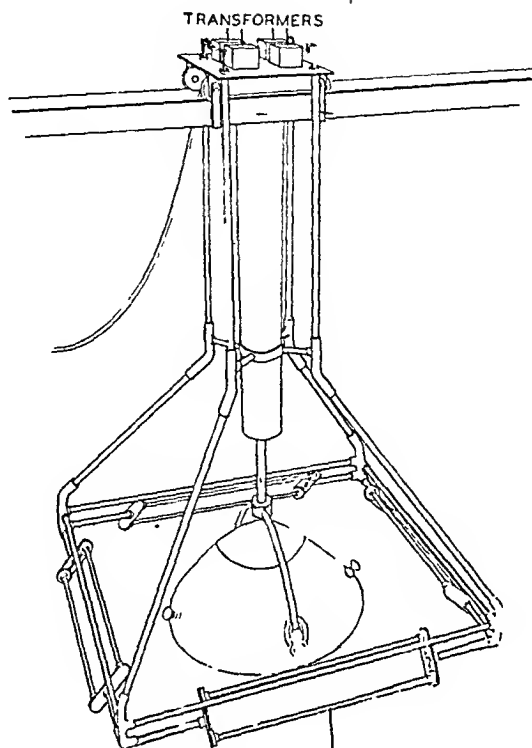
When writing please mention DISEASES OF THE CHEST

## STERILIZATION OF THE AIR IN THE OPERATING ROOM (Continued from page 14)

was less pain. Before beginning the use of bactericidal radiation four out of a total of six deaths in 110 operations for extrapleural paravertebral thoracoplasty were the result of infection. With bactericidal radiation there have been only two deaths in over 125 such operations and neither of these has been the result of an infection.

In over 450 operations performed in a field of air continuously exposed to this bactericidal radiation, no patient and no member of the operating room personnel has received a significant burn. Even with most inadequate protection there has been only an occasional scaling of the skin as in a mild sunburn. One nurse, who used no protection and did not wear glasses, developed a conjunctivitis which required the local application of cocain for its relief. This cleared up within 24 hours.

We feel that bactericidal radiation is the most efficient and the only adequate method of sterilizing the air in the vicinity of the operative wound. It has removed the greatest remaining source of wound contamination and has brought so called aseptic surgery one step closer to real asepsis.



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## THE CHILDHOOD TUBERCULOSIS PROBLEM (Continued from page 13)

*Sixth*, the positive reactor child, of the listless, poorly nourished, sub-standard type, is the object of a double threat and should be built up with the least delay. That it can be done with promptness has been shown by our preventorium experience.

*Seventh*, the improvement in the physical condition of the limited number of children cared for would justify the operation of the preventorium, but the demonstration of the manner in which results can be obtained in these children, makes it more useful as an educational institution for the whole community.

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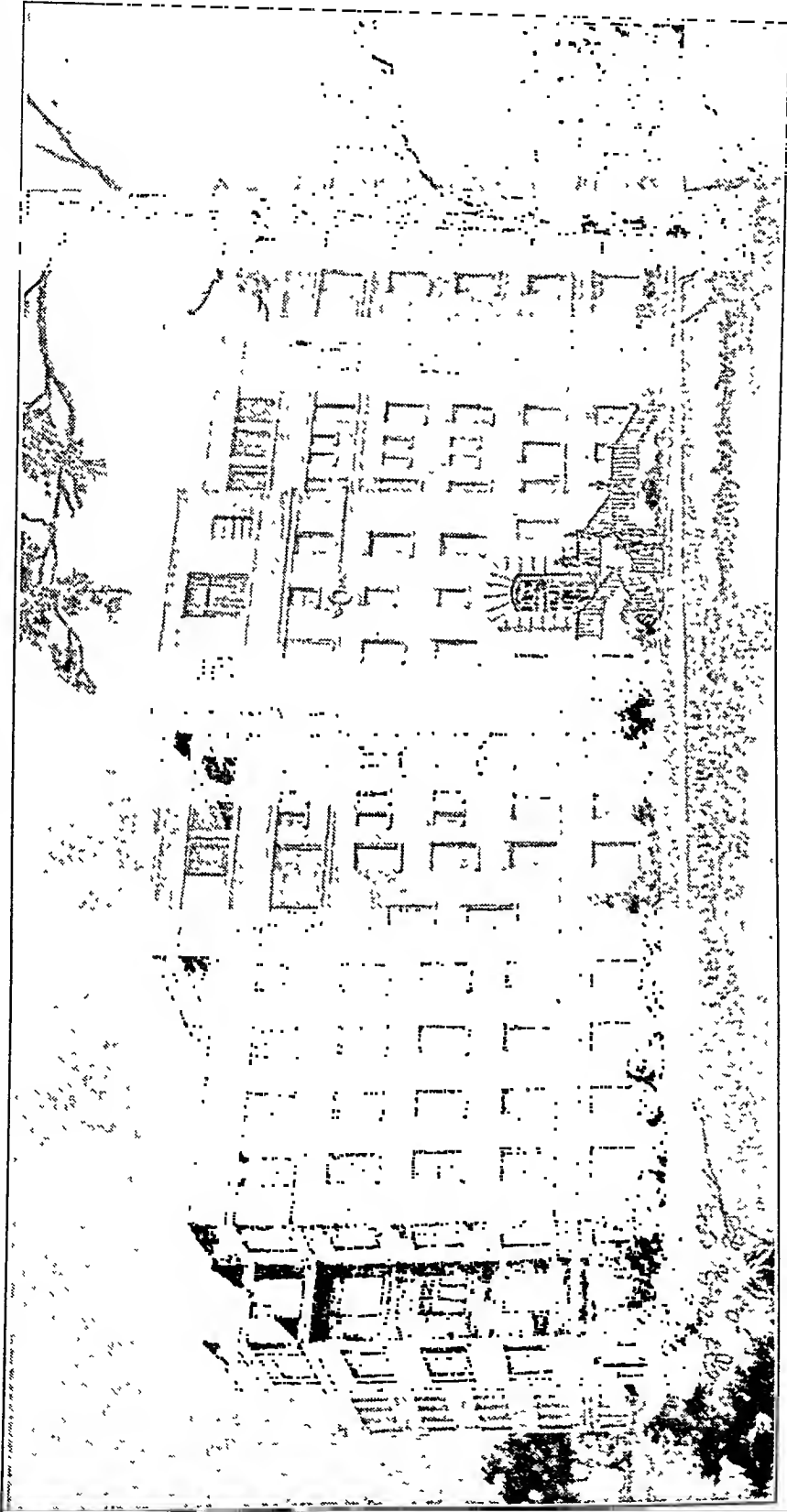
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## ANNOUNCEMENT

THE BUNCOMBE COUNTY MEDICAL SOCIETY will conduct a Tuberculosis Institute at Asheville, North Carolina, July 5 - 10th. Invitations have been mailed to 1100 medical societies, requesting physicians to make application to attend this first Seminar on Tuberculosis at Asheville.

The classes will be divided into small groups and a course of intensive instruction will be given. Didactic lectures will be avoided as much as possible.

The Committee in charge of the Institute are: Dr. Karl Schaffle, Chairman; Dr. C. Hartwell Cocke; Dr. Charles DeWitt Colby; Dr. J. W. Huston, Dr. Paul H. Ringer; and Dr. Martin L. Stevens.



New Main Building under construction.

# South Carolina Tuberculosis Sanatorium

STATE PARK, S. C.  
(Story on page 34)

J. B. Urquhart, Architect.

## SOUTH ATLANTIC STATES ISSUE

» » « «

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## FOREWORD:

In presenting this review of the achievements of South Carolina in the tuberculosis field, past and present, the South Carolina Tuberculosis Association wishes to make grateful acknowledgment to those who made it possible, the Committee for the South Carolina Section of the South Atlantic States Issue of Diseases of the Chest.

South Carolina's tuberculosis program is two fold: the State Sanatorium with its at-

tendant County health units, all of which is under the direction of the South Carolina Board of Health; and the South Carolina Tuberculosis Association with its 21 affiliated associations, all of which is financed chiefly by the sale of Christmas Seals.

Through words and pictures we are attempting to present an accurate cross-section of South Carolina's tuberculosis facilities.

## INDEX:

## THE LIMITATIONS OF ARTIFICIAL PNEUMOTHORAX

WILLIAM ATMAR SMITH, M.D., Charleston

## SOUTH CAROLINA STATE TUBERCULOSIS SANATORIUM

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## PINEHAVEN SANATORIUM

MRS. ASHLEY HALSEY, Charleston

## RIDGEWOOD CAMP FOR TUBERCULOSIS

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## GREENVILLE COUNTY TUBERCULOSIS SANATORIUM

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E. C. HOOD, M.D., Florence

## SPARTANBURG COUNTY TUBERCULOSIS SANATORIUM

J. MOSS BEELER, M.D., Spartanburg

# The Limitations of Artificial Pneumothorax

BY

WILLIAM ATMAR SMITH, M.D.

Charleston, South Carolina.

PERHAPS no single procedure in medicine has had a more profound and far-reaching effect than has the introduction and more general utilization of artificial pneumothorax in the therapy of pulmonary tuberculosis. Though quite different in its mode of attack, less specific in its adaptability and less certain in its application, it might take rank with the arsenicals in syphilis, insulin in diabetes and liver extract in pernicious anaemia; not solely because of consequences inherent in its own efficacy, but because of the wide therapeutic horizons which it has opened up. Like these modalities, it has revived and even revolutionized the whole therapeutic concept of the disease and stimulated research and investigation of even greater potentialities.

In recent years knowledge of the success of this measure has spread widely both in lay as well as medical circles. It is not, therefore, surprising that inquiry is frequently made of the sanatorium physician by the patient, his relatives, and often his personal doctor, as to why artificial pneumothorax has not been used. It is to these that this paper is addressed.

It is important to keep in mind that in the employment of collapse therapy a clear concept of the underlying pulmonary pathological changes should be had. This can only be ascertained by a careful clinical and roentgenological study. The form of treatment which affords the best possibilities of arresting the process with the least possibility of harm should be instituted. There is no one standard to go by; there is no one method applicable to all; each case presents its own problems, and to each the proper procedure must be directed if success is to be attained.

The accepted indications of artificial pneumothorax are:

*First*, predominantly unilateral disease. The process may be infiltrative, pneu-

monic or cavernous. If the latter, it is of the utmost importance that artificial pneumothorax be used as early as possible. A lesion in the contralateral lung does not contraindicate treatment of the most involved lung. Frequently, this will clear up when the other lung has been collapsed.

*Second*, in progressive minimal tuberculosis artificial pneumothorax should not be attempted until a brief period of observation on bed-rest fails to show improvement. Where tubercle bacilli are present, even though the process involves only a small area, the treatment should not be delayed very long.

*Third*, Artificial pneumothorax may be used in certain selected cases of bi-lateral disease with a fair degree of success.

*Fourth*, Cases of recurrent hemoptysis frequently demand immediate collapse. The wide-spread use of this method of treatment has been the means of cutting down the number of hemorrhage cases in the sanatorium to a minimum.

*Fifth*, In certain cases of pleurisy with effusion, where there is a known lesion on the affected side, the removal of fluid and the replacement with air is most helpful.

The induction of artificial pneumothorax is, of course, dependent upon a free pleural space. Extensive adhesions between the visceral and parietal surfaces of the pleura too frequently make this treatment impossible. Hence, no matter how well selected the case may be, no matter how pressing the need for collapsing the diseased area, when adhesions are present this form of therapy must be abandoned. Adhesions constitute the chief limitation to the application of artificial pneumothorax.

Not long ago two young female patients entered the sanatorium at about the same time. Both had cavernous tubercu-

losis in the lower lobe of the left lung; both were extremely toxic. Artificial pneumothorax was attempted almost immediately after admission. In one, successful collapse was obtained; in the other there was no pleural space. The first has recovered; the latter is dead. This is a common experience.

Cases with large, superficial, thin-walled apical cavities should rarely receive artificial pneumothorax. There is danger of rupture and there is little likelihood of successful collapse. Rest therapy should be first instituted, then later partial thorocoplasty or apicolysis.

The minimal fibroid cases involving the extreme apex should rarely require pneumothorax. These cases do best with phrenic interruption.

Bi-lateral cavitation frequently found in advanced disease presents a serious problem in collapse therapy. It is possible at times to use pneumothorax on one side and, later, to induce it on the opposite side, maintaining both simultaneously. In other cases pneumothorax may be applied on one side, the lung permitted to re-expand, and later the contralateral lung collapsed.

The usefulness of this procedure, however, in bi-lateral cases is extremely limited and only rarely successful. Every tuberculosis therapist has a few successes of this kind to report, but it is probable that all will agree that it is hazardous and only warranted because of the hopelessness of the situation without it.

Pneumothorax is unnecessary in the first infection types as the majority of these cases will heal without it. As a matter of fact, it is contraindicated, as it might be the means of adding fuel to the flame and might result disastrously.

In acute pulmonary types of tuberculosis pneumothorax is not often successful. Especially is this true in lobar involve-

ments. However, where cavitation develops it should be given a chance. In the acute broncho-pneumonic varieties it has a definite place and not really dramatic results are obtained.

Even with this, the mortality still remains high. It should not be withheld on that account where a free pleural space makes it possible.

Asthma and severe emphysema are distinct contra-indications for pneumothorax. Despite the desirable character of the lesions, the additional burden of the collapse in these cases with low vital capacity makes its employment quite hazardous.

In rare instances, where a cardiac disease complicates tuberculosis, artificial pneumothorax cannot be employed. Age, too, probably constitutes one of the limitations of the employment of pneumothorax. In childhood and in adolescence it is quite successful, but in persons beyond middle life, where the lung has lost much of its elasticity, only rarely should it be employed. However, I have a patient 72 years of age in whom the treatment has been very successful.

In conclusion I would emphasize that each case of tuberculosis demands individualization in choice of therapeutic procedure. Artificial pneumothorax is the best method of collapse therapy that is available at the present time, but it should be used with discretion.

It has certain distinct limitations, the first of which is brought about by extensive pleural adhesions, over which the physician has no control. Even where there is a free pleural space it should not be employed in first infection types, in tuberculous lobar pneumonia, in extensive bi-lateral disease, and in cases of pulmonary tuberculosis complicated by heart disease, asthma and emphysema.

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THE PRACTICAL JOURNAL ON CHEST DISEASES

## South Carolina Tuberculosis Sanatorium

STATE PARK, S. C.

BY

ERNEST COOPER, M.D., SUPERINTENDENT

(See Photograph on page 30)

The idea of a state tuberculosis sanatorium developed slowly in South Carolina. It was thirty years after Doctor Trudeau opened the now famous "Little Red," that any definite efforts were made to cope with the tuberculosis problem. The pioneers in this movement, themselves victims of the disease, began a campaign that extended to the General Assembly and in 1914 resulted in securing a modest appropriation of \$10,000 for the purpose of establishing a state sanatorium.

A site about ten miles from Columbia, the capital and geographical center of South Carolina, was selected as ideal; and the first unit, a ward of frame construction for sixteen men, was opened in May, 1915. Other buildings soon followed, including a preventorium for children and a building for negroes. By the year 1927 the South Carolina Sanatorium had reached a bed capacity of approximately 145 white adults, 26 negroes, and 48 white children.

In 1927 the Masons of South Carolina became aroused over the shortage of beds in the state for the treatment of tuberculosis. The Most Worshipful Grand Lodge of Ancient Free Masons of South Carolina appropriated \$10,000 for the erection of a sixteen bed cottage for ambulatory men. In 1929 Masonic Lodges raised \$50,000 with which they built a fifty-bed infirmary for white women.

A brick, fire-proof chapel and community building was erected in 1932. This building of beautiful modernistic design, costing approximately \$25,000, was secured by funds raised exclusively through the efforts of patients themselves. Labor for construction was furnished by the Reconstruction Finance Corporation.

The latest addition to the institution is the half-million dollar fire-proof building now under construction. This unit is being made possible through funds from the Public Works Administration and from bonds issued by the state of South Carolina.

So designed as to be completely fire-proof, this mammoth hospital building rising six stories high will have incorporated within its walls all modern conveniences and equipment.

The main dining room, nurses' dining

room, and kitchen will be housed on the ground floor, also the x-ray unit and out-clinic department. The general administration offices will be located in the first story with the two wings given over to patients' wards and four solariums. The second, third, and fourth stories will contain private bed-rooms, semi-private bed-rooms, two large wards, and four sun-rooms to each story. The top story will hold the operating room, recovery rooms, and a large sun deck.

The combined sanatorium, new and old, will cover about five acres and include twenty-five buildings. It will have a bed capacity of over 500 patients and accommodations for approximately 100 employees. A central heating plant will furnish heat for the entire sanatorium.

The South Carolina Sanatorium offers to all its patients—treatment, rest, and recreation. It is fully equipped with special facilities for administering all forms of modern tuberculosis therapy. Suitable cases have the benefit of pneumothorax, phrenicectomy, pneumolysis, oleothorax, and thoracoplasty. For diagnostic purposes there are x-ray and fluoroscopy. During the twenty-two years of its existence over 5000 patients have been admitted. Of this number over 4000 have been discharged and of this 4000 over 70 per cent either were "arrested" or showed improvement.

Since its beginning in 1915 the sanatorium has been under the supervision of the Executive committee of the State Board of Health as trustees and of Dr. Ernest Cooper as superintendent and medical director. Dr. James A. Hayne, secretary of the State Board of Health, holds with Doctor Cooper the distinction of having served the sanatorium since its opening to the present day.

These two score years of inspiration, foresight, and co-operation between the State Board of Health, the superintendent, his medical and nursing staffs, and the patients have resulted in a successful and progressive administration. Now with greatly expanded facilities for serving the tuberculous sick of South Carolina the sanatorium looks forward toward a new era of helpful service.

# South Carolina Sanatoria



## PINEHAVEN SANATORIUM

CHARLESTON, S. C.

BY

MRS. ASHLEY HALSEY, EXECUTIVE SECRETARY  
CHARLESTON TUBERCULOSIS ASSOCIATION

On the first day of June 1921, the Charleston County Tuberculosis Association was granted a certificate of incorporation by the State of South Carolina permitting it to "own and operate a Tuberculosis Camp and Hospital." With the legal preliminaries settled, the small determined group which for years had carried on in the interest of the tuberculous sick, turned its attention to securing a sanatorium.

In November, 1924, this ambition was realized and Pinehaven opened its doors to white residents of Charleston County. The plan provided a thirty bed building for white people and a separate building with domiciliary care for twenty Negroes, which opened its doors in March, 1925.

The City Fathers of Charleston deeded to the Charleston County Tuberculosis Association the 54.1 acres of pine-land six miles beyond the metropolitan area and the County Delegation, by a tax appropriation, provided for the construction of the buildings. This latter group since has made an annual maintenance appropriation to the association.

For several years, Pinehaven benefited from the Duke Endowment Distribution and as a result it was able without financial embarrassment to develop into a real hospital. Although charging those who

can pay in proportion to their financial ability to meet all or part of the cost of their care, the sanatorium has never had to refuse free care to white or colored citizens needing its services, except when accommodations were lacking.

In 1935, with an unsolicited appropriation of \$4000.00 from the Delegation and help in construction from the W. P. A. the Negro building was enlarged to care for thirty instead of twenty patients.

In 1936 a memorial gift made possible the construction of the Harry Frost Infirmary Wing, which provides proper accommodations for seriously sick white patients.

In the intervening years a 32 foot square living room was built, a doctor's office, operating room, x-ray room and equipment provided; and the grounds were laid out attractively.

The medical affairs of the sanatorium are ably administered by experts. Dr. W. Atmar Smith is Medical Director, Dr. William H. Prioleau does the surgical work and Miss Ola M. Woosley is superintendent.

Throughout its existence its medical procedures have been sound and progressive; its nursing care tender and unremitting, and its sense of human values retained.

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Everett E. Watson, M. D., Salem.

## FOREWORD:

The Virginia Tuberculosis Association, through its Executive Secretary, Miss Leslie J. Foster, is pleased to lend its support to this special issue of Diseases of the Chest; and extends its congratulations to the physicians of the Editorial Committee, under whose direction the Virginia Section of the journal has been compiled.

The Virginia Tuberculosis Association, now nearly thirty years old, sponsors tuberculosis work throughout the State of Virginia, through tuberculosis organizations which are agents of the Association in the sale of Christmas Seals, and for the expenditure of the local share of the funds thus derived. About 1500 persons in Virginia are giving their services without remuneration

to the campaign against tuberculosis.

The revenue derived from the annual sale of Christmas Seals helps pay for sanatorium and home treatment for the tuberculous, preventative measures for the protection of children against the disease, and a widespread educational campaign to inform the public as to tuberculosis and its control. In 1936, more than \$71,000 was spent in Virginia for these purposes.

The Association cooperates with the medical profession, and is pleased to render assistance when requested to do so.

We are pleased to announce that the Southern Tuberculosis Conference and Sanatorium Association, will meet at Richmond, Virginia, September 29, 30 and October 1st.

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HELEN A. KOSS, R.N., Danville

# Management of Empyema

BY

DEAN B. COLE, M.D.

Richmond, Va.

ALTHOUGH empyema is one of the oldest known diseases and the literature is replete with observations concerning its diagnosis and treatment, there is still much disagreement concerning treatment. Empyema necessitatus was known to the ancient Greeks and Egyptians, but no method of treatment was advanced until Hippocrates resorted to thoracotomy. He allowed the pus to escape through an opening made in the 8th or 9th interspace, keeping this closed with a tent of lint attached to a thread, removing it daily. On the tenth day he began injections of warm oil and wine. This treatment was not improved upon for some 1800 years until the introduction of rib resection in 1860. Since this time there have been a number of improvements with a multiplicity of apparatus, but not until 1918, during the influenza epidemic, was a serious study of this condition made. It was known before the World War that empyema may complicate traumatic hemothorax, or develop following measles or scarlet fever, but its development with other complications such as pericarditis, arthritis, peritonitis and mastoid infection was not recognized.

The diagnosis of empyema should be suggested by a rise of temperature and displacement of the heart with dullness, diminished breathing and absence of vocal resonance following the crisis in a pneumococcic pneumonia. The pleural infection following the virulent streptococcic respiratory infection called influenza is often more difficult to diagnose, although the diagnosis here is relatively simple if its likelihood is kept in mind. The two conditions differ as to cause, clinical manifestations and mortality, but the underlying principles of treatment are essentially the same. Such cardinal principles are now generally accepted for the ideal handling of both types of the condition, but a regrettable confusion persists in the practical application of

these principles, greatly to the detriment of many empyema patients.

The successful treatment of empyema requires the closest of cooperation between internist and surgeon since it is necessary that an accurate and correct diagnosis be made if the proper treatment is to be carried out. During the acute stage of pulmonary infection, this condition exceeds the pleural infection in importance of treatment. It is, therefore, often necessary to concentrate on the pulmonary condition, meanwhile treating the purulent pleural effusion with repeated aspirations and irrigations until such time as thoracotomy seems indicated. There are many varieties of suppurative pleurisy, the treatment of which depends largely on the underlying cause.

Pneumococcic pneumonia is the cause of more than fifty per cent of all empyemas. In this condition, the empyema develops late, usually after the pulmonary infection is subsiding, and pleural adhesions form early. The pus is thick and is not absorbed and is the principle cause of toxemia at this time. Therefore, its removal is necessary regardless of the patient's condition. Because of the pleural adhesions with fixation of the mediastinum, there is relatively little risk from any form of drainage.

Streptococcic empyema develops early in the course of a streptococcic or influenzal pneumonia and is usually co-existent with the pneumonia. Because of the presence of the pneumonia the pus should be aspirated repeatedly, if necessary, in order that symptomatic relief may be obtained until the pneumonia has run its course. The pus is thin and easily removed by aspiration. Since adhesions are late in forming, thoracotomy or any other surgery should be postponed until the pneumonia has subsided since there is risk of lung collapse from open pneumothorax and also the danger of a septicemia if surgical measures are uti-

lized too early in the course of the disease.

The ideal treatment in any empyema is the evacuation of the pus, sterilization of the pleural cavity, complete re-expansion of the lung and restoration of the patient's health. In most instances when the empyema is adequately drained the patient will make a prompt and uneventful recovery, but the tragic exceptions which constitute the failures make necessary a careful consideration of all avoidable complications in every patient. A painstaking investigation of every patient should be made routinely prior to operation. A consideration of the operative procedure both as to time and type of operation should be agreed upon. The character of pus found on aspiration, the period of time since the onset of the empyema, the x-ray and other evidence of mediastinal fixation or immobility will determine the emergency for operative drainage and the hazards of possible open pneumothorax. For example, when thick creamy pus is found on aspiration, we are assured of the presence of a localized walled-off empyematous abscess and may be practically assured of a fixed mediastinum. If accompanying this, x-ray appearance and needle puncture reveal a soggy, thickened pleura, the need of irrigation is recognized, for a resistant and plastic pleura requires disinfecting. In this condition we anticipate pleural adhesions with some difficulty in lung re-expansion. On the other hand, a thin pus in an ill patient immediately suggests a streptococcic infection. In such cases we are confronted with the treatment of the primary disease, and must recognize the disasters which are almost certain to follow if an open drainage is introduced, entailing pneumothorax with a spreading of the infection to an unprotected pleura through lung collapse and mediastinal shifting.

The attending physician and surgeon should be in agreement as to time and type of operation. In our experience, a simple method of closed drainage has proven preferable to the use of complicated apparatus. There is no definite

agreement on the method of drainage. Aspiration, intercostal drainage, and rib resection each has its indications and advocates. Good results from repeated aspiration have been reported by some authors. Intercostal drainage is desirable with many patients since it is easy to institute and causes a minimum hazard in an ill patient. Rib resection with closed or open drainage is preferred by many surgeons.

We have been impressed with the increased number of chronic empyemas that come under our observation. In our experience, the chief causes of chronicity are improper diagnosis and inadequate treatment of patients with acute empyema after a correct diagnosis has been made. The majority of these are results of ill-advised surgical interference which has been poorly executed, plus the cases which have been unrecognized. Chief among the causes of improper diagnosis are failure to keep in mind empyema as one of the most frequent serious complications and sequelae of acute chest conditions, especially of influenza and pneumonia. We often see patients giving a typical history of influenza or pneumonia with temporary improvement or recovery, followed by a so-called relapse, who might have been diagnosed as "lung abscess" or "tuberculosis", and given expectant treatment for weeks or months before empyema was suspected. Unfortunately, many of these costly mistakes are made in spite of all the facilities now available for correct diagnosis and adequate treatment.

In our experience, tuberculous empyema is not a surgical disease and we are convinced that if this condition is treated early, energetically, persistently, and adequately by repeated aspiration and irrigation practically all patients will recover. We believe all pleural fluids in tuberculous patients should be aspirated and replaced with air. If the fluid is found to be cloudy, the pleural cavity should be irrigated with a 1:3300 aqueous solution of azochloramid until the solution returns clear. Usually four to eight ounce-

es are sufficient. Following this from 25 to 50 c.c. of the 1:500 solution in Triacetin is instilled into the pleural cavity. This should be repeated daily at first and never less often than two or three times a week until the fluid has either become clear or ceased to reform. Following the instillation of azochloramid into the pleural cavity, some patients have a mild reaction characterized principally by soreness and pain in the chest and slight elevation of temperature lasting for one

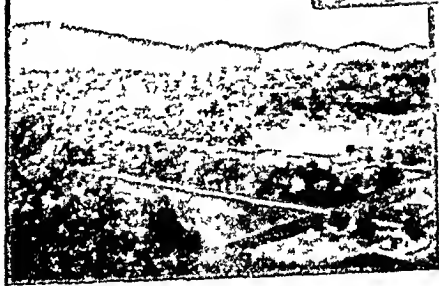
or two days. We have never seen a reaction of any consequence following this procedure. We endeavor always to prevent fever and other evidence of toxemia from the empyema with these patients and whenever one of our patients with a tuberculous empyema develops symptoms due to the empyema, we feel that we have not been sufficiently energetic in the treatment. If properly treated few of these patients will require thoracoplasty and almost none will require thoracotomy.

*"Reading Time of Papers published in Diseases of The Chest — 5 to 15 minutes"*

## MOUNT REGIS SANATORIUM

SALEM  
VIRGINIA

SALEM  
VIRGINIA



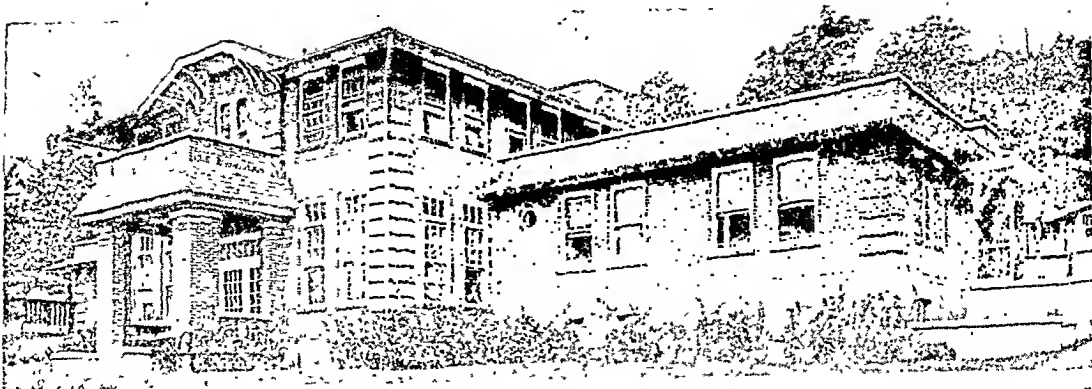
EVERETT E. WATSON, M.D.  
Resident Medical Director  
DOROTHY JOHNSTON  
Superintendent of Nurses  
LOUISE L. FOSTER  
X-ray and Laboratory  
Technician  
MRS. D. A. LYNCH  
Dietitian

Mount Regis Sanatorium, a private institution for the treatment of chronic pulmonary disease, was established by Dr. Everett E. Watson, in May, 1914. It is beautifully located, overlooking the picturesque old town of Salem, nestling in the Roanoke Valley between the Alleghany and the Blue Ridge Mountains of Virginia. It is situated on the summit of Mt. Regis Hill, fifteen hundred feet above

sea level, and enjoys a charm of unsurpassed scenic beauty.

Dr. Watson lives on the sanatorium grounds and is available day and night. Graduate nurses are employed and each department head has been at Mt. Regis for many years. The various specialists and hospitals of Roanoke are available for consultation when necessary.

# Virginia Sanatoria



(Staff House and Administration Building)

## CATAWBA SANATORIUM

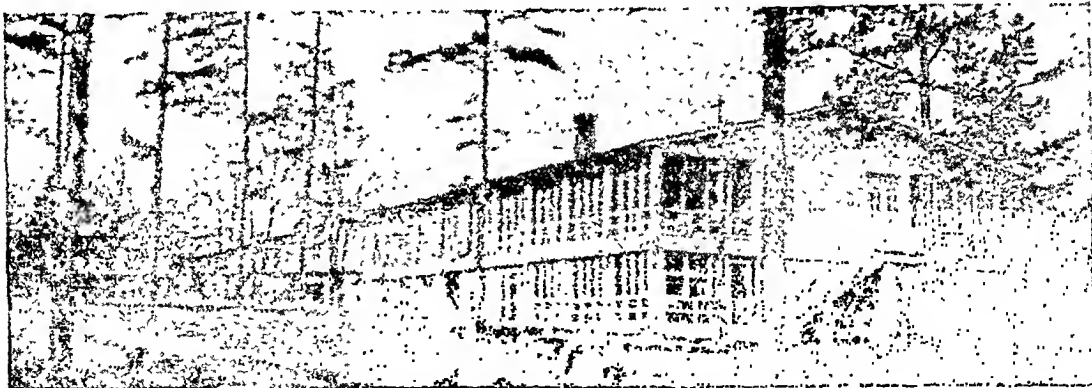
CATAWBA, VIRGINIA

BY

J. B. NICHOLLS, M.D., SUPERINTENDENT

CATAWBA SANATORIUM, oldest of the three sanatoria operated under the direction of the Virginia State Board of Health, is located in Catawba Valley—nearly 2000 feet above sea level—in the Allegheny Mountains of Southwest Virginia. At its official opening, July 30, 1909, two pavilions and four tents provided accommodations for 42 patients. Today the sanatorium plant, with its 1200 acres and 39 buildings, contains facilities for 340 patients and 120 employees. Since 1910 it has conducted a training school for nurses, whose gradu-

ates have attained a highly creditable standing. Since December, 1935, it has been testing the value of supplementary educational training for interested patients. In the building and achievements of Catawba Sanatorium, many have shared—particularly, the late Captain W. W. Baker, who is considered its founder; the late Dr. Ennion G. Williams, Virginia's first Health Commissioner, who served for 23 years; and Mr. A. Lambert Martin, Business Manager during the sanatorium's 28 years of existence.



## PIEDMONT SANATORIUM

BURKEVILLE, VIRGINIA

J. B. WOODSON, M.D., Superintendent

Piedmont, Virginia's Sanatorium for tuberculous Negroes was opened April 22, 1918 at Burkeville. This location was selected because of its transportation facilities and its close proximity to the Negro belt of the state. At this time there was only one building for patients containing thirty beds; this number was considered sufficient as it was not known whether the tuberculous Negro would accept sanatorium treatment. The experiment was successful and the institution gradually enlarged and today there are

three buildings for patients containing one hundred and fifty beds.

The institution contains all the necessary equipment for the modern treatment of tuberculosis. Since its inception 4,708 patients have been treated. All stages of pulmonary tuberculosis are accepted. The rates are \$3.50 per week. This includes board, lodging, laundry and medical attention.

A School of Nursing functions in connection with the institution and offers two years of accredited training in tuberculosis nursing for colored women.

# Virginia Sanatoria

## BLUE RIDGE SANATORIUM

Charlottesville

Virginia

by

WM. E. BROWN, M.D.

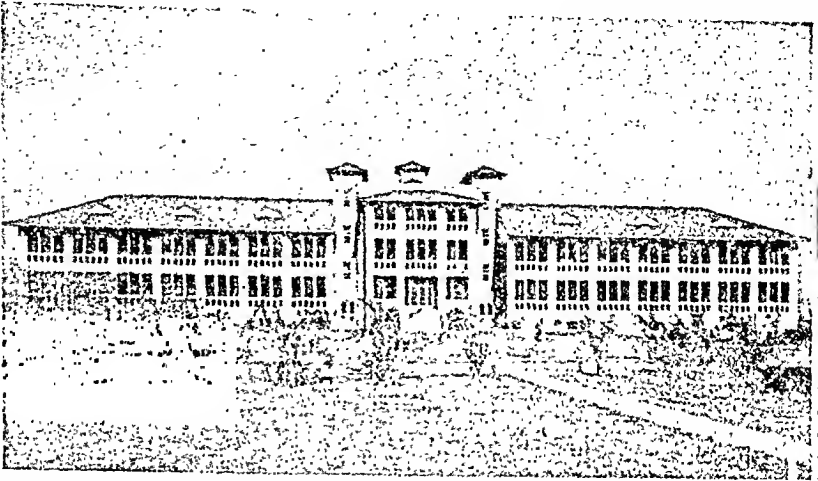
Medical Director

Blue Ridge Sanatorium was built by the Commonwealth of Virginia and opened for the treatment of patients in April, 1917, with a capacity of two hundred and twenty. From time to time additions have been made to the institution, and the present capacity is two hundred and thirty adults and forty children.

The sanatorium is equipped with every modern appliance for the treatment of pulmonary tuberculosis, and every patient after his admission is carefully studied by the medical staff and a course of treatment outlined.

The preventorium is for the treatment of early forms of childhood tuberculosis. Children from five to fifteen years of age are admitted to this department and are kept entirely separate from the adult patients. A school is maintained for them by the State Department of Education.

In addition to providing every facility for the recovery from their disease, the educational part of the work is probably the most important feature. Patients are taught the proper sanitary precautions to prevent their spreading the infection to others, and are required to carry out these measures during their stay



here so that when they leave they are thoroughly trained and should not be a menace to the people with whom they come in contact.

Another educational feature of the work is the maintenance of a Training School for Nurses. The graduates of this school are especially fitted to do tuberculosis and public health nursing.

Through an affiliation with the University of Virginia Hospital, the entire medical staff of the institution is available for consultation; and the third and fourth year medical students are given special instruction by the medical staff of the sanatorium in the diagnosis and treatment of pulmonary tuberculosis. This instruction of the future doctors is especially valuable, for they are thus better enabled to diagnose early tuberculosis and take care of this type of patient.



Building Now Under Construction.

## TIDEWATER VICTORY MEMORIAL HOSPITAL

NORFOLK, VIRGINIA

By MRS. P. E. LOTZ, President

On December 1929, a group of people who were interested in the health and welfare of Tidewater, Va., organized the Tidewater Tuberculosis Hospital Association for the specific purpose of building a Hospital to segregate advanced cases of tuberculosis.

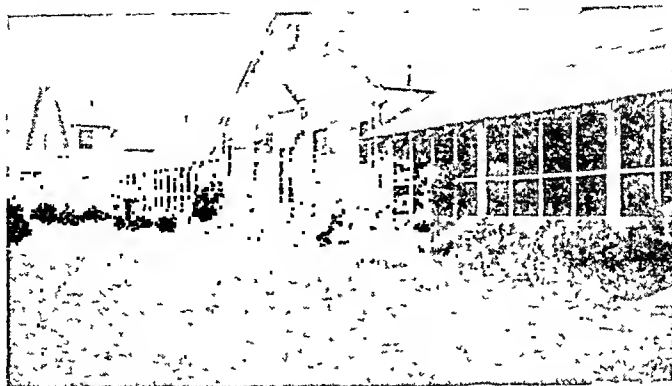
A state charter was obtained and 41 men and women were elected as the board of directors of the association. A beautiful 21 acre tract of land was purchased ten miles from Norfolk, on the Virginia Beach Boulevard. This purchase was made possible by public subscriptions.

Due to the depression, funds to build were not available until this past year, when a campaign was put on to raise these funds, in Nansemond, Isle of Wight, Southampton, Princess Anne and Norfolk Counties, and the cities of Norfolk, South Norfolk, and Suffolk.

The first two units of the Hospital are now being constructed and when finished and equipped will have cost approximately seventy thousand dollars. Other units will be built when possible.

(Continued to page 46)

# Virginia Sanatoria



## CHARLES R. GRANDY SANATORIUM

NORFOLK, VIRGINIA

BY

M. F. BROCK, M.D., MEDICAL DIRECTOR

The Charles R. Grandy Sanatorium is one unit of the Norfolk City Welfare Center. It is composed of the following buildings: Administration Building, Colored Infirmary, White Infirmary, and ten Cottages for ambulant white patients. The capacity

of the sanatorium is ninety patients. This is made up of sixty white, and thirty colored. About eighty per cent of the patients are from the city of Norfolk; the remainder from nearby counties.



## PINE CAMP SANATORIUM

RICHMOND, VIRGINIA

BY

P. E. SCHOOLS, MEDICAL DIRECTOR

1909—The Tuberculosis Camp Society was organized for the purpose of building a sanatorium to care for indigent tuberculous cases. The first meeting was held in the home of Miss Frances Scott. The first president was Mr. Fred W. Scott.

1910—The first building, with twenty beds, was erected at Pine Camp.

1911—The second building was opened. The building was erected through the generosity of Mr. J. C. Tinsley and Ginter Park Ladies Association.

1915—Pine Camp was given to the city by the Tuberculosis Camp Society and at that time the Camp Society was reorganized into the Richmond Anti-Tuberculosis

Association. Hon. John Garland Pollard was the first president of the new organization.

1923—Additions to Pine Camp Hospital.

1932—Addition of Infirmary and Administration Building to Pine Camp.

1933—Opening of Childrens Pavilion at Pine Camp.

1936—Opening of Negro Pavilion at Pine Camp, with provision for Negro children, the first in Virginia.

**PRESENT CAPACITY**—270—56 of which are for colored, 40 beds are reserved for white children and 16 for colored children. All surgery is done in the Sanatorium.

**TIDEWATER HOSPITAL (Continued from page 44)**

Mr. Vernon G. Eberwine is the Building Committee Chairman and Dr. C. Lydon Harrell will be the Medical Advisor.

The Hospital is in two units, "A" and "B". "A" consists of administration offices, operating room, fluoroscope and x-ray room, examination room, laboratory, kitchen, staff dining room, house doctors quarters, beds for 34 white patients, and working units to take care of same. The center of the building is two stories. The second floor is the superinten-

dants' and the white nurses' quarters. Unit "B" is for 16 colored patients, and the working units to take care of same. Over the center of this building are the quarters for colored nurses.

There will be a resident house doctor in the hospital, and a consulting medical staff, these to be elected from the different cities and counties in the district.

The directors expect to have the Hospital open for patients in the fall of this year.



## HILLTOP SANATORIUM

DANVILLE, VIRGINIA

BY

HELEN A. KOSS, R.N., SUPERINTENDENT

In 1914, two tuberculous individuals obtained permission to pitch a tent on city property. From this sprang the incentive to build a camp for the tuberculous of Danville and in 1915, a crude camp was opened with Miss Helen Koss in charge.

Not until 1922, after much agitation, was there any further development. Then, a 30 bed building was erected.

A small shack was built to serve as a preventorium. This, started merely as an experiment, led to a \$30,000 modern preventorium. The money was supplied by the Kiwanis Club in 1928.

The institution is supported by city council and Community Chest appropriations, in addition to the one half of the daily per capita cost that the state supplies.

PLAN TO ATTEND

## Southern Tuberculosis Conference

September 29-30 - October 1, 1937

MAKE YOUR RESERVATION EARLY

HEADQUARTERS

HOTEL JOHN MARSHALL

RICHMOND, VIRGINIA

When writing please mention DISEASES OF THE CHEST

## SOUTH ATLANTIC STATES ISSUE

» » « «  
GEORGIA SECTION

## EDITORIAL COMMITTEE:

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## FOREWORD:

The Georgia Tuberculosis Association wishes to compliment the Editorial Committee, which was instrumental in making possible this section, on its fine work. We are happy to have our state included in this South Atlantic States Issue of Diseases of the Chest.

Georgia takes its place in the parade of progress. With its seven active Tuberculosis Associations covering a large part of the state; with its active field unit under the able stewardship of Dr. Abercrombie and Dr. Schenck; aided by the able guidance of Mr. J. P. Faulkner, Executive Secretary of

the Georgia Tuberculosis Association, we march forward in the campaign against the Great White Plague.

We are proud of our accomplishments. We have seen the death rate steadily decline and the figures for 1935 are as follows: Total death rate among the white population, 634 or a rate of 32.9 per cent; among the colored race the total number of deaths is 1,060 or a death rate of 96.2 per cent. A recent survey gives 675 beds for the tuberculous sick in the various sanatoria over the state. The following pictures and articles to some extent tell the story.

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C. O. MIDDLEBROOKS, M.D., Athens

## BATTLE HILL SANATORIUM

J. C. BURCH, M.D., Atlanta

## THE ATLANTA TUBERCULOSIS ASSOCIATION

MARY DICKINSON, Atlanta

## HEALTH PROGRAM FOR CHILDREN AT MACON

JAS. P. FAULKNER, Atlanta

## HISTORY OF COLLAPSE THERAPY AT MACON

W. W. CHRISMAN, M.D., Macon

# Our Patients

AROUND and around, swirling in a mad fury, goes the age-old struggle for the control and eradication of tuberculosis—racing dizzily towards an inevitable destiny. It is like a gigantic spiral nebula whose whirling, revolving incandescence sweeps onward across the heavens of recorded history. Here and there cataclysmic explosions occur resulting in the creation of numerous Novae. Some shine forth with a sustained brilliance; others illumine briefly the celestial horizon, flicker, and with a sharp hiss subside into vaporous nothings. These Novae, we know them well. We have observed them, tested and weighed them. We have been exalted to the heights of anticipation and expectancy by them, only to be plunged into the depths, in their futility. We glorify in the dazzling brilliance of others. In this astronomical concept, we may review some of these ethereal new-births which have burst forth, and, with varying degrees of shining splendor, beamed through space in parade: the animal transmission of the disease, discovery of the tubercle bacillus, tuberculin, vaccines and sera, exercise in the open, the rest cure, chasing climate, the sanatorium, acid-base diet, sanocrysin, collapse therapy, chest surgery, and the Mantoux test. So, around and around, dizzily spinning, this huge galaxy of strife and struggle, failure and disappointment, hope and achievement charts its unerring course to inevitable glorious fulfillment. In the center of this spiraling vortex, the vital nucleus of it all, stands the patient. Let us come down to earth and make some comments upon the all important member of this scheme of things.

Without the patient, the familiar but glamorous story would have never been recorded; without the patient, the traditional struggles, ambitions, and accomplishments would have been pointless and fruitless. But there is the patient; and, as in the past, as at the present, and for whatever incursions into the future may

BY  
CHAMPNEYS H. HOLMES, M.D.  
Atlanta, Georgia

be needed, all effort will continue to be untiring and ceaseless. In response to this protective and shielding spirit of the medical profession—engendered in the remote beginnings, cradled in antiquity, nurtured and incubated during the middle ages, and today, consummated and sustained—the patients, or most of them, sense a deep, inherent obligation. This is as it should be. Those of us who have come into intimate contact with the tuberculous sick have often observed it, admired it, and, augmented by its presence, have been able to mobilize a mightier force to aid in the fight of his or her battle. To you delinquents in the ranks of patients who read these lines, let it be hoped that you will be inspired to abide by this message.

The psyche, the emotional and mental reaction, the psychology and psychopathology of the tuberculous patient have been studied by numerous investigators, and his studies have resulted in many conflicting opinions. The gamut from neurasthenia to genius has been run. Surely it would seem that there is no characteristic mental or emotional state peculiar to the victim of tuberculosis. On the other hand, it is most plausible and rational to feel that as a consequence of having the disease, with the necessary resignation and many adjustments, ample time for meditation, introspection, and stock-taking, there is exerted a profound influence upon, and modification of, the psyche. It seems to serve, except in an unfortunate few, to build and mold character. As with the bird of the ancient myth, a new Phoenix arises from the ashes and wings its way to previously unsoared heights. The euphoria and optimism of the tuberculous are so well known they have almost become tradition. It is with a distinctive pleasure and an utter sincerity that I can say that some of the loveliest and most charming personalities, some of the finest and most inspiring characters that I have ever

known, are numbered among my tuberculous patients. Those unfortunates, predominantly in the minority, who are rebellious, resentful, embittered toward their illness do not, with rare exceptions, do well. I count a buoyancy of spirit and a willingness of cooperation of paramount importance in the equipment of patients for fighting and overcoming their tuberculosis.

Despite the tremendous handicap of physical impairment, on numerous occasions there have been forged in this crucible of sickness, suffering, isolation, careers of far flung repercussions. To cite a familiar incident — *Treasure Island* was conceived by Robert Louis Stevenson when taking the cure, and while looking through, not at, the four confining walls of his cottage room. In this connection, I should like to recommend *Fighters of Fate* by Dr. J. A. Meyers. Some psychologists have stated that an inferiority complex exists in the tuberculous patient. To make up for this, to over-compensate, superb efforts are made in one or more directions. Not infrequently, genius accrues. True it is that many names of the world great are the names of those who have battled the Great White Plague. The following is only a partial list of some of them: Spinoza, Nadson, Gorki, St. Francis of Assisi, Chateauluriant, Mozart, Rueckert, Schiller, Goethe, Novalis, Voltaire, Kant, Chopin, Keats, Artemus Ward, Sidney Lanier, Paganini, Elizabeth Browning, Harold Bell Wright, Eugene O'Neill.

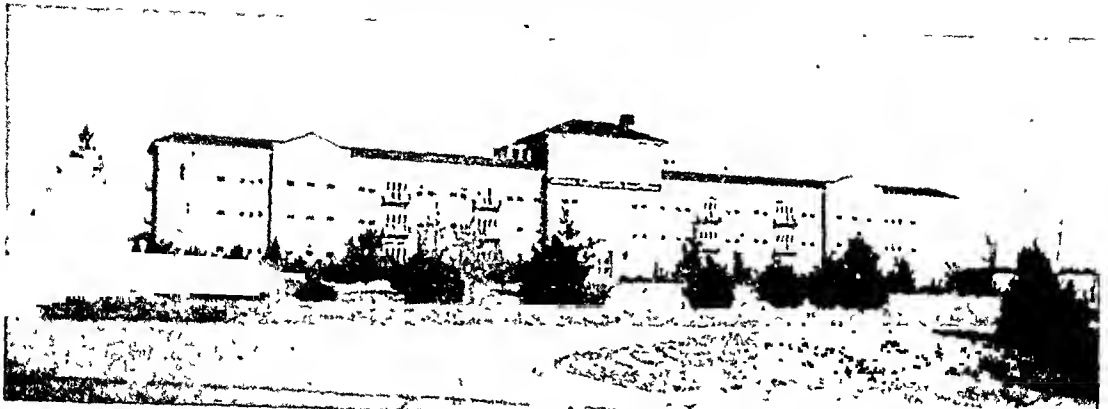
I earnestly subscribe to the belief that a patient with tuberculosis have a basic, firm, lucid knowledge of the disease. It is a common practice when that one is confronted with a problem the surest approach to its solution is through the acquisition of knowledge and information pertaining to it. A patient with tuberculosis has to contend with this disease through the years. This disease proves the exception to the rule, "what you don't know won't hurt you," because in tuberculosis *it pays to know!* The source of this knowledge should be your

doctor and authentic medical literature, not the newspaper, magazine, or the prying, nose-y—albeit well meaning—neighbor or friend. I think it wholesome to impart to patients some knowledge of the pathological process in their own lungs. It is intriguing, and at times amazing, to hear them refer to their rales, their cavity—something so intimately and vitally their own—as something apart.

There is a role of tremendous significance and importance filled by our patient, of which I feel entirely too little mention has been made; and for which too inadequate credit has been rendered. This is the role of the missionary in the tuberculosis field, the spreader of the true gospel. It is frequently my duty to "break the news" to individuals suffering from tuberculosis, and to outline for them the long rough road ahead. Those of you who have been on the receiving end of this experience know only too well the emotional storm created within you at this crisis, recall the sickening multitude of doubts, fears, and perplexities that assailed you. I know of nothing more effective in allaying these anxieties, in smoothing the troubled waters, than the soothing council and softening words of comfort from the ex-patient, one who has been "through the mill". Likewise, most effective in dispelling the apprehension in patients incident to beginning pneumothorax treatment is the moral support imparted by the veteran of many refills. I have utilized this support on many many occasions, both to the advantage of my patient and myself. In our ex-patients, we have a host of workers crusading under the banners of the double-barred cross, lending a friendly helping hand, giving wise suggestions and advice, pointing the way. How often they are instrumental in causing one to consult a doctor. They know the handwriting on the wall. Every physician has seen cases which he can trace back to this source. In my own practice, a substantial per cent of my patients have come through these channels. So patients, present, past and future,

(Continued to page 53)

# Georgia Sanatoria



## GEORGIA STATE TUBERCULOSIS SANATORIUM ALTO, GEORGIA

BY  
D. T. RANKIN, M.D., SUPERINTENDENT

In 1911 funds were appropriated by the legislature for a sanatorium for tuberculous patients in Banks County near Alto, Ga., and in 1913 the institution was opened for incipient and moderately advanced cases. The buildings comprised: one for the more acutely sick and six pavilions for the ambulant and semi-ambulant. As time went on, it was found that more space was necessary and a tract of land was purchased just across the county line in Habersham County, and the present main building was erected with a capacity for 170 patients and opened in 1927. This was equipped with x-ray, laboratory and

operating rooms.

The Childrens' Building was erected and given to the state by the Masons of Georgia in 1930 and provided 72 beds for white childhood tuberculosis. The old sanatorium was turned over to the negroes giving them 87 beds. In 1932 Thomas County built and deeded to the state a brick cottage with space for 16 patients. This gave a total capacity of 343 beds.

The sanatorium provides the latest in treatment for tuberculosis. Collapse is obtained by pneumothorax, phrenicotomy, pneumolysis, apicolysis and thoracoplasty.



## FAIRHAVEN SANATORIUM

ATHENS, GEORGIA

C. O. MIDDLEBROOKS, M.D., Medical Director

Fairhaven Tuberculosis Sanatorium, nestled in a grove of whispering pine trees, atop a crest in the foot-hills of Georgia's mountains is equipped to give complete and modern treatment to tuberculosis patients.

The 36 bed hospital is equipped to do x-ray, fluoroscopic examinations, and pneumothorax. For major surgical work the sanatorium has entree to the Clarke County Hospital.

A full corps of nurses is retained, including a hospital superintendent on full-time duty. The staff includes a medical director and advisory board.

The structure housing the sanatorium was built

by Clarke County with funds secured from a bond issue in 1927. Finding the maintenance too burdensome, they leased it to the Clarke County Tuberculosis Association in 1929. This organization now operates it under a board of trustees elected from its members.

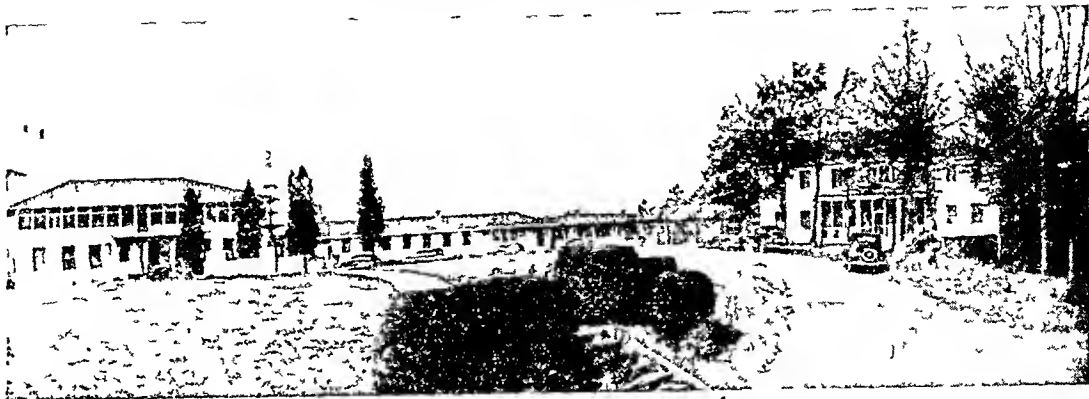
Located only two and one-half miles from Athens, Georgia, there is a daily mail service. Also patients' relatives, who accompany them and live in town, are within easy access.

Rates are nominal in all divisions of the hospital: private rooms, semi-private rooms, and the wards.

Mrs. Elizabeth Hood is the superintendent and Dr. C. O. Middlebrooks is the Medical Director.

~ ~ ~ ~ ~ please mention DISEASES OF THE CHEST ~ ~ ~ ~ ~

# Georgia Sanatoria



## BATTLE HILL SANATORIUM

ATLANTA GEORGIA

By J. C. BURCH, M.D., Asst Superintendent

Battle Hill Sanatorium is owned and operated by Fulton County and the City of Atlanta for the treatment of pulmonary tuberculosis. Only patients who are citizens of this county are eligible for admission.

The sanatorium opened for the reception of patients in 1910 with sixty-six beds for white adults. Since then it has grown to its present capacity of two hundred and fifty-five beds. There are complete separate departments for white adults, white children, negro adults and negro children.

The laboratories contain up-to-date equipment. In the clinical laboratory will be found all necessary reagents and equipment for carrying out any investi-

gation required in this type of institution including complete blood studies. The x-ray laboratory is equipped for any kind of photographic or fluoroscopic work.

In the treatment of tuberculosis, the old tripod rest, good food and fresh air is supplemented by such modern procedures as ultra-violet rays, laryngeal cauterization, pneumothorax, phrenic interruption, and thoracoplasty in those patients where it appears indicated, the major surgery being done in local general hospitals. Dr. J. H. Bradfield is the Superintendent of the sanatorium.

## THE ATLANTA TUBERCULOSIS ASSOCIATION

BY

MARY DICKINSON

Executive Secretary

The Atlanta Tuberculosis Association is the largest local unit within the state. It serves about 400,000 people and covers a territory of 813 square miles. Thirty years ago this unit was begun as a small clinic fostered by the Fulton County Medical Society, and state health officers, in cooperation with a private agency, then known as "The Associated Charities." Later the organization became known as the Atlanta Tuberculosis Association, which now promotes clinics, nursing service, laboratory service and an educational program. A recent survey of the patients show that 55 per cent are colored and 45 per cent are white and that both races are represented in the medical and nursing service. In the report for 1936 it is shown that 3596 different individuals passed under the observation of the clinic staff of 43 physicians who held a total of 968 clinics.

Monthly reports are made to the three health officers in the district served by the association. The community unites through its community chest, its tax funds, and through the sale of Christmas Seals in financing the work. The control of the business side of the organization is in the hands of a group of lay men, of which Mr. T. M. Forbes, is President. Dr. E. A. Bancker, Jr., is chairman of the Medical Staff.

The extensive work of the association makes possible almost any type of research work desired in the tuberculosis field. The preventative program is being extended through group studies and institutions, colleges, schools, and rural groups. The educational department, largely staffed by men in the medical field, is steadily building up an intelligent cooperation of lay people. All types of educational facilities are used, exhibits, lectures, classes in tuberculosis control, films and radio addresses.

The services of the Atlanta Tuberculosis Association are extended to positive cases, suspects, and people who have been in contact with tuberculosis and are unable to have private physicians. This is a service which is extended to those who are sick and unfortunate. The educational program may be secured by anyone. There is a well organized colored branch which is carrying forward the educational programs in their own districts. The public school authorities are working in close cooperation and organized clubs, of both men and women, are ardent promoters. While the 1936 budget shows an expenditure of \$32,169.86, it was demonstrated that at a conservative estimate, the association had received volunteer service worth \$46,000.00.

# Georgia Sanatoria



## HEALTH PROGRAM FOR CHILDREN AT MACON, GEORGIA

BY

JAS. P. FAULKNER, Executive Secretary  
Georgia Tuberculosis Association

The Tuberculosis Commission of Macon, Georgia, of which Mr. Lee M. Happ is the Chairman, has taken the lead in Georgia in giving care to undernourished children for a number of years. The health officer and the school physician and nurses have referred to the commission a number of children, both white and colored, that are in need of special care and the commission has prepared for them pleasant quarters in sections of the city parks where they can carry on their studies, receive proper rest and recreation, and have additional food supplied them.

These children have almost invariably shown great improvement physically as well as in their studies, and, in order that those whose home conditions are the least satisfactory may in the summer session not lose the gains they have made, groups of the white children are carried to a delightful camp in the mountains of North Georgia.

It has not been possible yet for the commission to provide the summer camp experience for colored children, but they are splendidly cared for in Macon and become a husky lot.

## AT MACON, GEORGIA HISTORY OF COLLAPSE THERAPY

BY

W. W. CHRISMAN, M.D.  
Macon, Georgia

Collapse therapy was instituted in 1933 as a part of the program for the control of Tuberculosis provided by the City-County Department of Health: clinic space, fluoroscopic service and personnel were provided by the Health Department and General Hospital; a public spirited citizen donated the pneumothorax equipment; one physician with previous experience volunteered to give all pneumothorax treatments. Clinics were held once a week during the first year.

With an increasing number of patients coming for treatment and a greater interest on the part of other physicians, it became necessary to hold two clinics a week and the attending staff was increased to three. The reasons for the rapid growth of the clinic assured its success: The number of hospital beds for the tuberculous was limited; the waiting lists were long; applications for hospitalization would be pending for months. Col-

lapse therapy offered hope to many in this group. It helped to fill the gap between diagnosis and hospitalization. Soon it became obvious that such careful selection of cases was not necessary. Contrary to general opinion, good results were often obtained in the colored race.

One year ago surgical collapse was inaugurated through the general hospital and a competent staff surgeon. This included phrenics and thorocoplasty.

During 1936 a total of 300 refills was given. Thirty-six new patients received pneumothorax. Twelve patients had their phrenic nerve crushed and two had thoracoplasties done.

That these good results have been obtained in the face of obstacles speaks for the method. The majority of patients came from destitute homes where proper food could not be obtained. Many who should have been straight bed patients, attended clinics every week.

When writing please mention DISEASES OF THE CHEST

## OUR PATIENTS (Continued from page 49)

let us all march together in cohesive unity, and keep our faces turned toward the day when upon our shields of battle victory will be emblazoned.

Now, back into the skies whence you came, O Heavenly body, and whirl rapidly onward to your destiny. We eagerly

and watchfully await the genesis of greater and more luminous Novae, to shine as guiding beacons whither we go. It can only be to that glorious fulfillment where mankind stands free of the shackles of the dread plague tuberculosis. God speed! O Patient—forebear!

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## Evaluation of Phrenic Nerve Surgery in the Treatment of Pulmonary Tuberculosis\*

THIS STATISTICAL study was undertaken recently for the purpose of determining, if possible, what actual service phrenic nerve surgery could render under the conditions of treatment necessary in our own department. In order to permit a fair comparison with other statistical studies a description of our facilities is pertinent. The Jackson Memorial Hospital is a general hospital, owned and operated by the City of Miami as a charity and "pay" or private institution. The Department of Tuberculosis has thirty beds for the treatment of white patients and sixteen beds for that of colored. Patients are usually referred through an ambulatory clinic or directly by one of the other services of the hospital. Since the bed capacity of the department is not adequate to handle all applicants, an attempt is made to make the period of hospitalization as short as possible consistent with safety to the patient and his family. Some patients are not able to arrange for suitable care outside of the hospital because of economic condition. These patients are frequently held longer than is actually necessary or are occasionally sent to a convalescent home provided they are non-contagious. The duration of hospitalization not being an actual gage of the condition of the patient, it has been omitted from this report. After discharge from

BY  
M. JAY FLIPSE, M.D.,  
E. C. BRUNNER, M.D.,  
I. N. SNYDER, M.D.,  
JAMES H. PUTMAN, M.D.  
Miami, Florida

the hospital, patients with any type of collapse therapy are observed in an ambulatory clinic, staffed by the same physicians who treated them during their hospitalization.

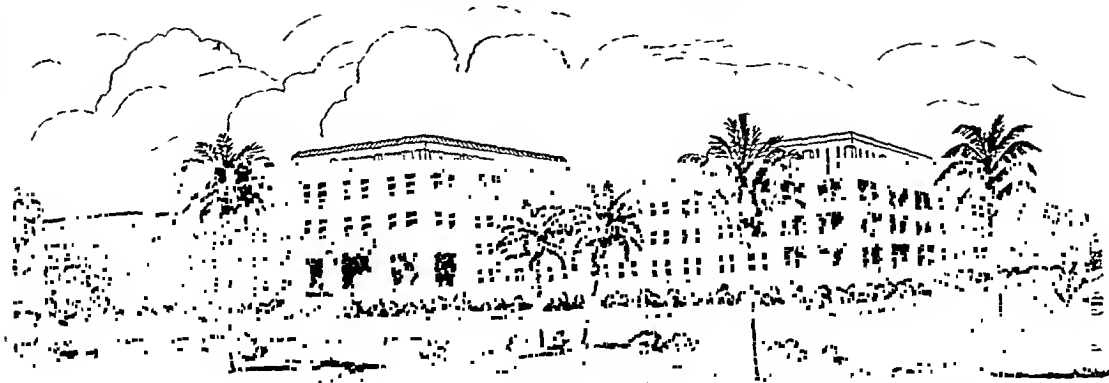
In the selection of cases for phrenic nerve surgery, each case is studied both clinically and by x-ray, frequently in conference with several members of the staff. Each of the operation's in this series was performed by the same surgeon and the request as to the type of operation originated in the medical division of the tuberculosis service. The surgeon's council and advice has, with rare exception, approved of the type of operation requested by the attending medical staff. Follow up observation is entirely under the direction of the medical division of the tuberculosis staff.

### *Types of Operations*

Two types of operations are used, temporary phrenic and permanent phrenic interruption. In the permanent type, the peripheral segment of the nerve is evulsed and a segment of 6 to 10 cms. usually removed. In the temporary type, the nerve is injected with alcohol and then crushed with a hemostat for a distance of 1 to 2 cms. Both operations are performed under novocaine anesthesia. As will be noted in table I (following page), the permanent operation was generally used in the earlier cases in our series and the temporary

(Continued to page 60)

\*Based on the study of 85 consecutive cases on the Charity Service of the Jackson Memorial Hospital, Miami, Florida.



## FLORIDA STATE TUBERCULOSIS SANATORIUM

MRS. MAY McCORMICK PYNCHON

JACKSONVILLE, FLORIDA

An important objective in Florida's twenty-year-old fight on tuberculosis will be attained in the spring of 1937 with the opening of the State's \$600,000 sanatorium near Orlando. The hospital will house 400 patients and will be equipped to provide the most advanced treatment devised by medical science.

With the completion of the sanatorium, Florida will be well prepared to attack this disease along three important fronts; preventive work, which is being carried on by the State Tuberculosis and Health Association; early discovery and diagnosis, which will be one of the major functions of the recently created tuberculosis unit of the State Board of Health; and adequate treatment for the patient.

First plans for a tuberculosis sanatorium in Florida were made in 1927, when the State Legislature created the State Tuberculosis Board and authorized an appropriation of \$200,000. The money was not made available, however, until the past summer when taxes on the estate of the late Alfred I. duPont yielded \$3,000,000 in unbudgeted income. This together with a loan and grant from the Federal Emergency Administration of Public Works, enabled the board to begin construction.

Orlando was selected as the site because of its central location, public utility and transportation facilities and because of hospital and medical facilities available. The building is on a hilltop and has been planned so as to admit the maximum amount of sunshine and to take advantage of prevailing winds. There will be two wings—one with 300 beds for white patients and the other with 100 beds for negro patients. The wings will be connected by an arcade.

The negro wing is complete with small

recreation room and offices for eye, ear, nose and throat specialists, dental treatment rooms and other facilities. A negro interne will be employed. Separate entrances have been constructed.

The Florida Works Progress Administration in a cooperative plan with the County Commissioners of the county in which the institution is located will finance a beautification and landscaping project. This includes the construction of recreation facilities, plans for white and colored patients, and the restoration of a lake over which the sanatorium looks.

Indigent patients will be admitted through the various boards of County Commissioners in accordance with the original law passed in 1927, under which the institution will be operated. Under this law County Commissioners are responsible for the financial care of patients from their counties. A bill is before the Florida Legislature at this time which if favorably considered will give the counties financial aid. An appropriation is set up in the bill on which counties utilizing facilities at the sanatorium can draw for two-thirds of the per diem cost, but not to exceed \$3.00 per day. This per diem cost also liquidates the loan from the Federal Government. The estimated annual cost per patient is \$1,000.

Dr. R. D. Thompson, formerly medical director and superintendent of the State Tuberculosis Sanatorium, Statesan, Wisconsin, has been selected for medical director and superintendent of the new institution which will be ready for occupancy late in the summer of 1937.

The State Tuberculosis Board, which will direct the operation of the Sanatorium, consists of: W. T. Edwards, chairman, Jacksonville; Mrs. Murray L. Stanley, Daytona Beach; and Dr. Arnold S. Anderson, St. Petersburg.

# DISEASES OF THE CHEST Table No. 1—RESUME OF CASES.

Case No.	Age	Sex	Race	Date of Operation	Site	Indication, Location	Degree of Collapse	Bronchitis	Type of Operation	Present Condition
69401 W.N.	34	F	C	11/26/32	L	Possible miliary.	Moderate	Improved, lived 1½ years	Exerostis	Expired, 4/25/35
52652 N.J.	40	M	C	9/ 7/32	R	Large apical cavity, pneumothorax not complete.	Fair	Improved.	Exerostis	Unknown
51180 J.N.	40	M	C	6/10/32	R	Large apical cavity, bilateral slight disease, pneumothorax incomplete.	Slight	None, lived 2½ years	Exerostis	Expired
51482 E.F.	22	M	C	7/ 2/32	L	Extensive bilateral disease, more on left, pneumothorax failed, developed fluid.	Slight	Improved	Exerostis	Expired, 1937
50770 W.C.G.	26	F	C	5/23/32	L	Diffuse involvement of left lung.	Slight	Improved for short time	Exerostis	Expired, 1933
51218 A.P.	36	M	C	7/11/32	R	Cavity—hemorrhage, in hospital short period of time.	Slight	None	Exerostis	Expired, 7/17/32
51094 S.R.	37	M	C	5/13/32	R	Extensive involvement, pneumothorax not complete.	Fair	Improved	Exerostis	Good
60400 G.S.	35	M	C	8/26/33	L	Caseous involvement of upper half not completely closed.	Good	Good	Exerostis	Good
80720 G.L.	42	M	C	6/ 8/35	R	Bilateral disease, pnx. on left.	Fair	Unknown	Exerostis	Unknown
80680 F.S.	34	M	C	7/27/35	R	Fair advanced, complete consolidation, adhesions. Pneumothorax not satisfactory.	Fair	Fair, lived 2 mos.	Exerostis	Expired
81742 C.E.	28	F	C	8/26/35	R	Progressive—bilateral pneumothorax on left.	Slight	Fair	Exerostis	Expired
80833 W.J.	25	F	C	7/27/35	L	Bilateral disease, more on left, not controlled by collapse, bilateral collapse.	Slight	Fair	Exerostis	Expired
80384 E.S.	25	F	C	7/28/35	L	Large apical cavity, bilateral involvement, failed to control by pneumothorax.	Slight	Fair	Exerostis	Expired
80259 M.W.	17	F	C	7/27/35	L	Bilateral disease, cavities failed to close under pneumothorax treatment.	?	?	Exerostis	Unknown
80551 M.S.	31	F	C	8/26/35	L	Bilateral disease, cavities and adhesions.	Fair	Good	Exerostis	Good

## DISEASES OF THE CHEST

Table No. 1—RESUME OF CASES—Continued.

Caso No.	Age	Sex	Race	Date of Operation	Site	Indication, Lesion	Degree of Collapse	Benefits	Type of Operation	Present Condition
92152 F.B.	20	F	C	8/ 8/36	R	Bilateral disease with cavities. Right side not controlled by pneumothorax. Had numerous adhesions, also mastoiditis.	None	Slight	Exeresis	Expired, 10/25/36
90285 Y.W.	24	F	C	6/ 2/36	R	Bilateral disease, failure of pneumothorax on right side, successful on left	Slight	Slight	Exeresis	Expired
90513 R.H.	30	F	C	6/ 2/36	R	Failure to close apical cavity by pneumothorax. Bilateral disease.	Moderate	Slight, cavity still open	Crushing	Unknown
92183 R.B.	38	M	C	7/22/36	?	Patient brought into hospital from County Hospital for one day only.	?	?	Exeresis	Unknown
92182 W.B.	23	M	C	7/22/36	?	From Dade County Hospital.	?	?	Crushing	Unknown
92185 O.M.	19	M	C	7/22/36	?	From Dade County Hospital.	?	?	Crushing	Unknown
96904 P.C.	30	F	C	5/20/36	L	Bilateral cavities more marked on left—adhesions. Pneumothorax failed	None	Slight	Crushing	Expired, 12/24/36
92075 F.S.	35	M	C	7/22/36	R	Bilateral disease with apical cavity not controlled by pneumothorax due to adhesions.	Moderate	Improved slightly	Exeresis	Expired
92717 W.B.	32	M	C	8/14/36	L	Bilateral disease with cavities unable to collapse left.	Good	Improved	Exeresis	Good
95501 C.R.	24	F	C	11/ 7/36	R	Bilateral disease and bilateral pneumothorax, apical cavity.	Fair	Fair, cavity still remaining	Phrenicotomy	Good
94222 L.L.	37	M	C	11/ 7/36	R	Bilateral disease with pneumothorax apical cavity, also basal lesion right side.	Slight	Fair	Crushing	Unknown
90340 H.R.	37	M	C	5/19/36	R	Extensive apical involvement with adhesions	?	?	Crushing	Unknown
88383 L.F.	29	F	C	3/19/36	R	Exudative type, cavities not closed by pneumothorax completely.	Moderate	Good	Exeresis	Good, sputum positive
86267 M.W.	33	F	C	1/13/36	L	Apical cavity, adhesions, failure to control by pneumothorax.	Slight	Fair	Exeresis	Good

poor cooperation on the pneumothorax program. Only rarely was it thought probable that the phrenic operation alone would be curative.

### *Race, Age and Sex Incidence*

AGE	WHITE		COLORED	
	Male	Female	Male	Female
0 - 10	0	1	0	0
11 - 20	1	1	1	2
21 - 30	3	12	2	9
31 - 40	7	11	12	2
41 - 50	4	3	1	0
51 - 60	5	0	0	0
61 - 70	3	0	0	0
Totals	23	28	16	13
Total White - 51			Colored - 29	

TABLE NO. II.

Table No. II shows the Race, Age and Sex incidence of 80 of the cases in this series. The age of the other 5 cases was not available from the records. It is interesting to note that 28.75 per cent of the phrenic operations were performed on white women from 20 to 40 years of age. This same age group in both sexes and races furnished 72.5 per cent of the cases in this series, the youngest case was 10 years and the oldest, 66 years of age.

### *Results*

	WHITE		COLORED	
	Male	Female	Male	Female
Good	14	14	3	4
Fair	4	3	0	0
Poor	0	1	0	0
Died	4	10	6	8
Totals	22	28	9	12

TABLE NO. III.

There are only seven known survivors from the colored patients who have had phrenic nerve operations. This constitutes

one-third of the colored patients whose subsequent history is known. The average survival since operation for this group of seven is slightly less than two years, but only 2 of the 7 were operated on prior to 1935. One case has survived 59 months, but is still being treated by pneumothorax.

Among the white patients the ratio of survival is better: 36 of this group are known to be alive and 14 dead. The ratio of living to dead is 2.05 to 1 in the white group and 1 to 2 in the colored. The average survival since date of operation among the whites is 27.5 months and 13 have survived over 2 years. Five of the cases have survived over 5 years. However, all of these cases were of a far advanced bilateral nature and none are considered cured as yet. The fact of their survival is in itself significant, since none of these patients would have given a prognosis of surviving for two years without collapse procedures.

### *Conclusions*

From the survey itself we are forced to conclude that while the procedure of phrenic nerve operation has merit, it is more useful as a secondary measure than as a procedure of choice in cases of far advanced disease. It has its place in helping to control the lesion in far advanced bilateral disease until more opportune time for major surgery, such as thoracoplasty. It has value in augmenting an incomplete phrenothorax in selected cases.

Concerning the choice of temporary and permanent phrenics, our opinion is crystallizing in favor of the temporary operation except where the degree of destruction of the lung is such as to warrant little hope of ultimate usefulness. Where the lesion is apical, a temporary phrenic has the advantage of saving some degree of usefulness for the lower lobe after an apical thoracoplasty has been performed.

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# EVALUATION OF PHRENIC NERVE SURGERY IN THE TREATMENT OF PULMONARY TUBERCULOSIS (Continued from page 54)

operation was used most frequently during the last few years.

## Discussion of Indications

Practically all of our cases fall in the group of patients on whom pneumothorax has been tried and been unsuccessful, or had been thought inadvisable because of the probability of failure. In the majority of these patients the disease was bilateral and thoracoplasty was not warranted because of extensive pathology in the con-

tralateral lung. In most instances, the rationale of the phrenic operation was to try to benefit rather than to cure the patient and possibly to prevent a spread of the disease until the contralateral lung could be improved sufficiently to warrant thoracoplasty on the side of the phrenic operation.

In some instances, phrenic surgery was used to augment the collapse obtained with partial pneumothorax. Occasionally, phrenic operation was advised because of

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# Program

FOR THE THIRD ANNUAL MEETING OF THE

## Federation of American Sanatoria

(A National Association of Chest Physicians)

Convention Headquarters: THE RITZ-CARLTON HOTEL, ATLANTIC CITY, N. J.

### SUNDAY, JUNE 6th:

8:00 P. M. Executive Session, Ritz-Carlton Hotel.

### MONDAY, JUNE 7th:

9:30 A. M. Administrative Session, Ritz-Carlton Hotel.

Opening Remarks: Frank Walton Burge, M.D., Philadelphia, Pa.; Chairman, Committee on General Arrangements.

President's Message: William Devitt, M.D., Allenwood, Pa.; President, Federation of American Sanatoria.

Address: Edward W. Hayes, M.D., Monrovia, California; President-Elect, Federation of American Sanatoria.

Report: R. B. Homan, Jr., M.D., El Paso, Texas; Secretary-Treasurer, Federation of American Sanatoria.

#### Report of Committees:

1. Membership Committee; Frank Walton Burge, M.D., Philadelphia, Pa., Chairman.
2. Committee on Economics; Louis Mark, M.D., Columbus, Ohio, Chairman.
3. Committee on Education; A. J. Cohen, M.D., Philadelphia, Pa., Chairman.
4. Statistical Committee; Edward W. Hayes, M.D., Monrovia, Calif., Chairman.
5. Legislative Committee; Marcus W. Newcomb, M.D., Browns Mills, N. J., Chairman.
6. Editorial Board; Diseases of the Chest; Chas. M. Hendricks, M.D., El Paso, Texas, Chairman.
7. Nomination Committee; A. D. Long, M.D., El Paso, Texas, Chairman.

#### Election of Officers:

New Business, Resolutions, and Announcements.—Adjournment.

1:00 P. M. Luncheon Meeting, Ritz-Carlton Hotel.

Address: Jay Arthur Myers, M.D., Minneapolis, Minn.  
Edward W. Hayes, M.D., Monrovia, California, Chairman.

2:30 P. M. Scientific Session, Ritz-Carlton Hotel.

- Champneys H. Holmes, M.D., Atlanta, Georgia, Chairman.
1. The Collapse of Cavities in Pulmonary Tuberculosis by Surgical Means—John Flick, M.D., and John H. Gibbon, M.D., Philadelphia, Pa.
  2. The Early Diagnosis of Pulmonary Tuberculosis—Marcus W. Newcomb, M.D., Browns Mills, N. J.
  3. Silicosis—Ross K. Childerhose, M.D., Allenwood, Pa.
  4. Bronchography—Frank Walton Burge, M.D., and Joseph W. Post, M.D., Phil., Pa.
  5. The Present Status of Surgical Treatment of Pulmonary Tuberculosis—A. J. Cohen, M.D., Philadelphia, Pa.

Note: The Clinical Session is open to all physicians and there is no registration fee.

7:30 P. M. Banquet and Installation of Officers.

Address: William Egbert Robertson, M.D., Philadelphia, Pa.  
Wm. C. Voorsanger, M.D., San Francisco, California, Toastmaster.

### SPECIAL FEATURES:

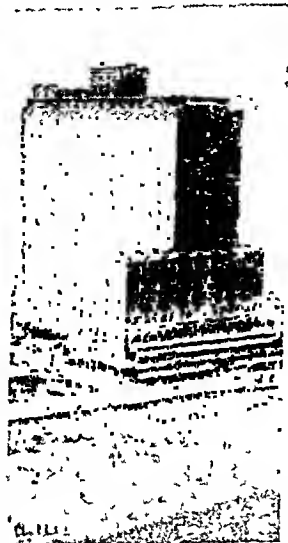
A Scientific Exhibit showing the educational features of the Federation of American Sanatoria has been prepared by William Devitt, M.D., Allenwood, Pennsylvania; President of the Federation of American Sanatoria, and it will be exhibited at the Convention Auditorium, Atlantic City, N. J., during the week of the meeting, June 7th-11th. Members of the Federation of American Sanatoria will be in attendance at the exhibit.

Interesting papers on subjects dealing with Chest Diseases have been included in the different Sections of the programs to be given by the American Medical Association. The members of the Federation of American Sanatoria are invited to attend those Sessions and to participate in the discussions.

### ENTERTAINMENT:

Clyde M. Fish, M.D., Pleasantville, N. J., Chairman.  
The Sea View Golf Club is opening its golf course to the members of the Federation of American Sanatoria. For further particulars communicate with Dr. Clyde M. Fish, Chairman, Entertainment Committee.

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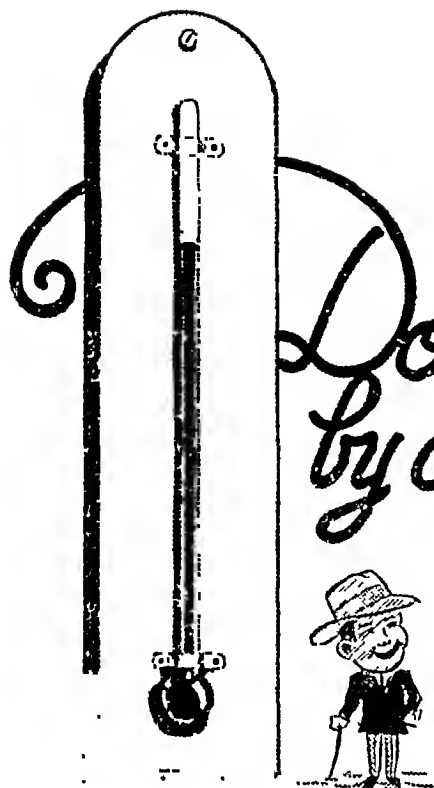
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# DISEASES *of the* CHEST

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PUBLISHED MONTHLY by the FEDERATION OF AMERICAN SANATORIA  
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## CONTENTS:

### EARLY TUBERCULOSIS

*by A. A. Tombaugh, M. D., McConnelssville, Ohio.*

### HOW TO HANDLE ASTHMATIC PATIENTS

*by A. A. Leonidoff, M. D., Poughkeepsie, New York.*

### THE RELATION OF THE SANATORIUM TO THE TREATMENT OF TUBERCULOSIS

*by LeRoy S. Peters, M. D., Albuquerque, New Mexico.*

### TUBERCULOSIS IN THE AGED

*by John W. Shuman, M. D., Los Angeles, California.*

### WHEN NOT TO USE SUN TREATMENT IN PULMONARY TUBERCULOSIS

*by LeRoy Elrick, M. D., Denver, Colorado.*

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**NOTICE:** Annual Meeting of the Federation of American Sanatoria  
the Ritz-Carlton, Atlantic City, New Jersey, June 7-11, 1937

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## A rise of TEMPERATURE

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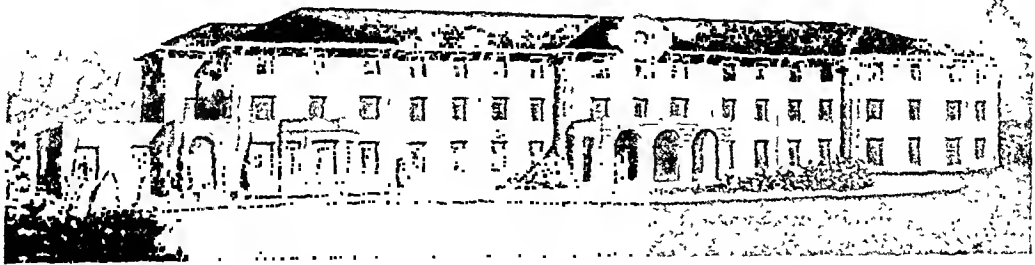
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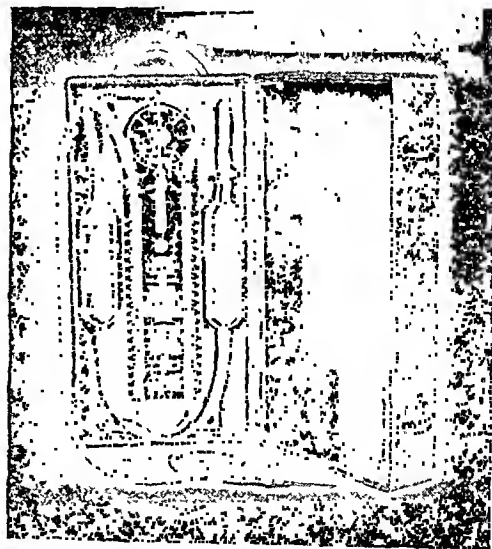
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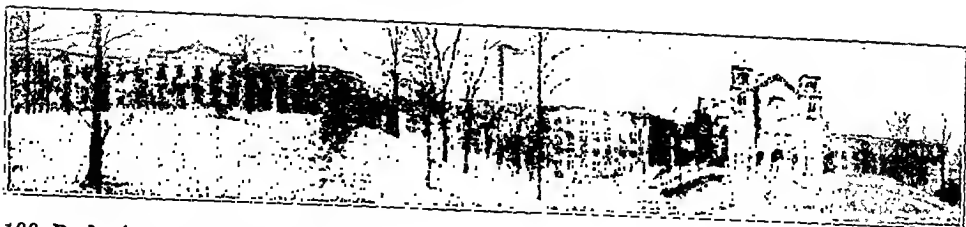


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# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

MYRTLE AND VIRGINIA STREETS

EL PASO, TEXAS

May 1, 1937.

Gentlemen:

This is the *seventeenth* in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

It is the purpose of the Committee on Economics of the Federation of American Sanatoria to bring to the attention of physicians and to those officials who see large groups of patients, the facilities which the private sanatoria of this country have to offer to the tuberculous.

The first sanatoria in this country were established through private initiative and by private funds. We have come a long way since then, but our experience has taught us that individual private care can best be obtained in a private sanatorium.

The pioneers in the fight against tuberculosis have been the physicians in the private practice of chest diseases. They have kept in step with the modern trends of diagnosis and treatment. They are today, the members of the Federation of American Sanatoria and you will find them listed in our recent Pneumothorax Directory.

For your convenience, we have listed below the private sanatoria affiliated with the Federation of American Sanatoria. They are the finest private sanatoria in the United States and they are well equipped to cater to the welfare of your patients. Elsewhere, throughout this journal, you will find individual listings of these sanatoria.

For further particulars address any of the sanatoria or write to the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,  
Federation of American Sanatoria.

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Holy Cross Sanatorium

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Valmora Sanatorium

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#### San Angelo

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Ward's Court

#### San Antonio

Dr. Farmer's Sanatorium  
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### WASHINGTON

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## CHEST

(A MONTHLY PUBLICATION)

Subscription: United States and  
 Canada \$2.00 per year. Other  
 countries \$2.50 per year.  
 Entered as second-class matter  
 August 18, 1936, at the post office  
 at El Paso, Texas, under the Act  
 of August 24, 1912.

*"The most important factor in diagnosis in  
 the majority of cases of pulmonary tubercu-  
 losis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

On to Atlantic City A GLANCE at the program for the annual meeting on June seventh, will surely encourage every one of us to attend. In addition to the scientific programmes, Doctor Burge has arranged for an interesting tuberculosis exhibit in conjunction with the scientific exhibits of the A. M. A. One of our members will be in charge of the exhibit at all times throughout the meeting. Every member of the Federation of American Sanatoria should arrange to attend this meeting. The eastern members will undoubtedly attend in large numbers; we hope our western fellows will go in as large numbers as possible. The distance is great, but it will be worth the time and expense to all of us. Make your reservation at the Ritz Carlton now.

C. M. H.

**Scientific Program on Tuberculosis:** WE ARE pleased to announce the following program to be given at the meeting of the American Medical Association, in the Scientific Assembly before the Section on Practice of Medicine, on the morning of June 10th, at the Auditorium, Atlantic City, New Jersey.

**PARASITISM OF THE TUBERCLE BACILLUS—**

*William Charles White,*  
 Washington, D. C.

**THE LASTING CURE OF TUBERCULOSIS—**

*J. Burns Amberson,*  
 New York, N. Y.

THE DIAGNOSIS AND MANAGEMENT OF LATENT, SUSPECTED AND EARLY CLINICAL TUBERCULOSIS—

*H. W. Hetherington, Philadelphia, Pa.*

Dr. Olin West, Secretary and General Manager of the American Medical Association has extended an invitation to the members of the Federation of American Sanatoria to attend this Session and to enter into the discussion of the papers.

M. K.

**Atlantic City Meeting:** THE Committee on Arrangements for the Third Annual Meeting of the Federation of American Sanatoria

reports that plans are rapidly being completed for the entertainment of the members of the F. A. S., who are planning on attending the meeting this year, at Atlantic City, June 7th to 11th.

Most of the activities of the Federation of American Sanatoria will take place on Monday, June 7th; and it is hoped that the members of the F. A. S., will make their plans so as to be present at the scientific and social programs being planned for that day.

The beautiful Ritz-Carlton Hotel at Atlantic City has been selected by the Committee on Arrangements for the center of F. A. S. activities, and our Luncheon Meeting and Banquet will be held at the Ritz-Carlton on Monday, June 7th. Notable speakers will address both

meetings.

The Administrative Meeting of the F. A. S. will be held at the Ritz-Carlton on the morning of June 7th; election of officers and important reports of committees with discussion, should be highly interesting to the members of the Federation of American Sanatoria.

Meeting your *old friends* and making *new friends* is always an interesting part of the F. A. S. meetings. **MAKE YOUR PLANS NOW TO BE AT THE RITZ-CARLTON, ATLANTIC CITY, ON THE 7th OF JUNE.**

M. K.

**Scientific Program on Diseases of the Chest: F. A. S. Program** THE SCIENTIFIC Program Committee for the Atlantic City meeting

of the Federation of American Sanatoria announces the following program to be given at the Ritz-Carlton Hotel, Atlantic City, on the afternoon of June 7th.

**EARLY DIAGNOSIS OF PULMONARY TUBERCULOSIS—**

*M. W. Newcomb,*

Browns Mills, N. J.

**THE COLLAPSE OF CAVITIES IN PULMONARY TUBERCULOSIS BY SURGICAL MEANS—**

*Flick and Gibbon, Philadelphia, Pa.*

**SILICOSIS—** *Ross K. Childerhose,*  
Allenwood, Pa.

**BRONCHOGRAPHY—** *Burge and Post,*  
Philadelphia, Pa.

**THE PRESENT STATUS OF SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS—**

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M. K.

**Distribution of Tuberculosis Mortality in Southeastern United States** THE U. S. Public Health Service has made many valuable surveys recently on the distribution of the mortality of tuberculosis. Dr. C. C. Dauer and Dr.

L. L. Lumsden of the U. S. Public Health Service have recently released the following concerning the Southeastern United States:

Tuberculosis mortality for white persons has been for a period of years higher in Tennessee and Kentucky than in the registration area as a whole. Virginia and

Maryland have had rates about equal to those for the entire country. The remainder of the South has had a relatively low rate.

Tuberculosis mortality in the colored population has been much lower in the southern than in the northern states.

In the southeastern section of the country the area of high mortality for the white population centers in Tennessee and Kentucky. It declines gradually in all directions from this central zone. The areas or zones of high mortality for the colored population of the southeastern states are quite similar in extent to those for the white population. C. M. H.

**A New Conception of Bronchiectasis** A PAPER bearing this title was presented at the recent meeting of the Arizona State Medical Association by Doctors C. S. Kibler and S. H. Watson of Tucson, Arizona.

They reported finding a number of cases among patients coming under their observation recently which were of allergic etiology. In these cases eosinophils were found in the sputum in fairly large numbers, and upon the proper testing from an allergic standpoint, and the application of the treatment indicated as a result of this testing, these patients were relieved of all symptoms of bronchiectasis.

The authors suggested that in examining the sputum for eosinophils a single examination, if negative, should not be accepted as sufficient. They sometimes found specimens negative when another specimen obtained from the same patient a few hours later would prove positive.

Doctors Kibler and Watson are to be congratulated upon the presentation of this new theory in the etiology and treatment of a most troublesome disease, the successful treatment of which has not been entirely satisfactory in the past; and it is hoped that other investigators and clinicians will follow their lead with a further study on a larger series of cases, and that the authors will continue to publish, from time to time, the results of their experience. R. B. H., SR.

**PRESIDENT'S MESSAGE** NEXT MONTH the Federation of American Sanatoria will have completed its second year of service. I feel it has made a place for itself among the medical profession.

I trust we will always bear in mind the important work that has been so ably brought to the attention of the family physician. If tuberculosis is ever to be eliminated it must be done through the efforts of the man who first comes in contact with the patient. In ninety per cent of the cases it is the family physician who does this. I would not for a moment lessen the credit due to the voluntary health organizations, but from now on the burden of responsibility must be placed on the shoulders of the family physicians. It is our job, as the Federation of American Sanatoria, to keep them alive to this responsibility.

The family physician should be reminded that there are surer ways to make a diagnosis of tuberculosis, rather than by the use of the stethoscope. In the hands of a man who has not been sufficiently trained, it is worse than useless. Often negative findings lead the doctor and the patient into a sense of false security. I believe it is responsible for more far advanced cases of tuberculosis than any other single agent. Too often the patient's physician, after placing the stethoscope on the chest says, "John, I can't hear a thing." This statement may be true so far as he is concerned, but only because he cannot interpret correctly the things he does hear. This gives the doctor and the patient a false sense of security, which security will be shattered when the patient has an x-ray film taken by a good competent man.

It is not fair to expect the busy practitioner to hear what we hear who are always listening. It is up to us to show them an easier way, and it is so simple, I marvel that it has not come into universal use many years ago.

What then, can we tell the busy man? What are a few things the family physi-

cian should know about tuberculosis? *First*, impress him with his own importance in the tuberculosis battle. Tell him we cannot do our work without him. *Second*, tell him not to place too much stress on his negative stethoscopic findings. A negative stethoscopic diagnosis is even worse than useless. *Third*, tell him fatigue is the outstanding early symptom. Fatigue will show in ninety per cent of early cases. *Fourth*, tell him a cough lasting longer than five weeks is not caused by a cold or bronchitis. *Fifth*, tell him to have the sputum examined in all cases of cough lasting over five weeks. This is one of the first rules, and a single negative sputum is of no importance. *Sixth*, tell him to must have all chest cases x-rayed by a competent x-ray man. *Seventh*, tell him a slight pulmonary hemorrhage is often the first symptom of tuberculosis. It may even appear before fatigue. *Eighth*, tell him that temperature and loss of weight are both suspicious, but even here the x-ray will make the diagnosis easier for him.

If we, as the Federation of American Sanatoria, can awaken the family physician to bear in mind these few rules, I predict it will not be many years before tuberculosis will not be the Captain of the Hosts of Death. Every member should endeavor to get a place on his County Medical Society program, and I would advise him to talk only on one topic, namely,—*A Few Things the Family Physician Should Know about Tuberculosis*. These, summed up are: 1. His Own Importance. 2. Fatigue. 3. Cough lasting longer than five weeks. 4. Sputum examinations. 5. Loss of weight, and a temperature. 6. And most important of all, always have him x-rayed. It is the constant reiteration of these facts that will bring results. It is not for the Federation members to go into a scientific discussion of the disease. Other organizations are better able to do this than we are. Our work must be with the family physician, and the only place we can reach him is through his own Medical Societies.

WILLIAM DEVITT, PRESIDENT.

# Early Tuberculosis

WHILE great progress has been made in the reduction of the mortality from tuberculosis in the past quarter century, yet it still ranks as one of the greatest agencies for destroying human life and so demands the earnest attention of all practitioners of medicine.

The very fact that the mortality has been greatly reduced calls for greater interest on the part of the profession than has ever yet been manifested. For now we can truthfully say it is a preventable and curable disease. But regardless of the progress made, advanced tuberculosis still remains a menace to the individual who has it and through him to the race.

Early tuberculosis can nearly always be healed with restoration of the patient to an efficiency little if any short of normal. Even if one is suffering from advanced lesions, he may still overcome the disease; but he maintains his health thereafter only by living carefully and always bearing in mind that he has had a serious infection which may again be stirred to activity through indiscretion or stress.

The ravages of tuberculosis can best be stayed by eliciting the earnest cooperation of general medical men. Specialists may make the diagnosis with greater accuracy because their attention is constantly held to this one subject, but specialists do not see the case first. The man who sees the disease earliest is the family physician, so upon him rests the burden of early diagnosis.

The most important thing for the physician to know is when to suspect the presence of active tuberculosis. He can get his mind in the most advantageous mood for aiding in the fight against tuberculosis by keeping the disease always in mind and by being thoroughly imbued with hopefulness for a condition diagnosed and treated early, and with a realization of its seriousness if neglected.

BY  
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For those who are not accustomed to making frequent chest examinations it should be known that a fairly accurate opinion may be formed in most cases of active tuberculosis by other methods of studying the patient. Of these the most important is the clinical history. By carefully analyzing the clinical history alone a very large majority of frank cases of early active tuberculosis may be diagnosed.

The symptoms of tuberculosis are many and varied. No one symptom alone is of value but all symptoms must be carefully considered and given a place in the diagnosis.

For the sake of brevity in giving the symptoms, Pottenger's classification will be used. Three groups are given:

1. Those due to toxemia and other causes acting generally.
2. Those due to reflex causes.
3. Those due to the tuberculous process itself.

Under those due to toxemia are listed:

I. Malaise, which is one of the very important symptoms of active tuberculosis—a gradually developing tiredness, one that seems not to be accounted for by anything the patient is doing and further may at times seem out of proportion to other signs of disease that may be present.

II. Loss of weight. During health a fairly regular weight is maintained by most people with variations of a pound or two in the course of weeks. If there be a loss of from five to ten pounds within a few weeks time it should be considered as having some serious nutritional change as a basis, such as is so frequently produced by the toxins of tuberculosis.

III. Temperature. A rise of temperature of a few tenths of a degree was formerly considered as a sufficient basis

for diagnosing tuberculosis. It is known today that other infections, instability of the nervous system and various other factors will cause a slight elevation of temperature. So temperature by itself is of little diagnostic value but in combination with malaise and loss of weight becomes of vast importance.

IV. The other symptoms under this group are night sweats, metabolic disturbances, digestive disturbances, and increased pulse rate.

Under those due to reflex causes:

I. Hoarseness and throat irritation. If one inquires carefully into the history, the patient will often complain of slight hoarseness and throat irritation. This is due to the reflex relationship between the pulmonary branches of the vagus and the laryngeal branches of the same nerve. Cough is a part of the same reflex.

II. Flushing of the face. This is a reflex through the vagus and 5th cranial. It rarely manifests itself unless the infiltration in the lung is fairly extensive and the disease active.

III. The other symptoms under this group include circulatory disturbances, chest and shoulder pains, and diminished motion on the affected side.

Under those due to the tuberculous process itself:

I. Hemoptysis. We formerly stated that spitting blood, unless it could be shown to come from the gums or a heart lesion, was due to tuberculosis but this must be revised as we now know that since the pandemic of influenza we have had many infections of the respiratory tract that now and then may cause spitting of blood. Tuberculosis is by far the most common cause of hemoptysis yet we should remember the other causes. Small streaks or specks may be disregarded. But any amount from a dram on up has a very significant diagnostic part to play.

II. Sputum. Sputum is of the greatest importance in diagnosis. If bacilli are found, that alone is sufficient. This is the only symptom on which, alone, a diag-

nosis can be made. Negative sputum, however, has no definite diagnostic significance. Yet a small amount of sputum coming on when the patient is below par or persisting for a time after acute bronchitis should be always considered as possibly being due to tuberculosis. One should not rely on the statement of the patient that he raises nothing. He should be given a cup and have him save all expectoration for a period of 24 to 48 hours and this should be concentrated and examined. Small amounts of sputum accompanied by toxic symptoms and cough are very indicative of tuberculosis.

III. Pleurisy. Pleurisy, whether dry or accompanied by effusion, is most often due to tuberculosis. Pleurisy with effusion without other known cause, has long been considered as being due to tuberculosis.

IV. Frequent and protracted colds. Tuberculosis at times in its early stages takes the form of repeated attacks of bronchitis. The patient usually considers each attack a cold. The symptoms in such cases are caused by a metastatic extension of the disease, usually caused by comparatively small numbers of bacilli, yet sufficient to produce an allergic reaction.

The patient usually has a slight elevation of temperature of four or five days duration, is toxic, has headache, suffers from malaise, loses appetite and some weight. He often thinks he is bilious. He usually coughs and may or may not expectorate. The toxic symptoms with temperature may clear up within four or five days or may hang on for several weeks. Even if the toxic symptoms subside after a few days, cough and expectoration, if present, usually continue for several days or weeks longer. The sputum during and immediately following the attack may show the presence of bacilli even though they disappear later. An x-ray at this time may show a flakiness which will pass away in a few days or weeks.

Of these three groups of symptoms the last group has the greatest significance,

since any one of the symptoms mentioned will lead to a positive diagnosis in itself if accompanied by one or more of the symptoms enumerated in the previous groups.

### *Diagnosis*

It will be seen from this discussion of the symptoms of active tuberculosis that if physicians who are not specialists in diseases of the chest will learn to think of symptoms from the standpoint of their etiology and learn to put an interpretation upon them as they appear in combination, they can nearly always arrive at a probable diagnosis. If in doubt, or if they wish to make diagnosis more certain, there are other measures at their command which will aid.

1. Atrophy of soft tissues over chest. Often, on the first glance at a chest, one sees a lessening of tissue above the second rib anteriorly and the spine of the scapula posteriorly. Sometimes this is considered and spoken of as contraction of the apex but careful inspection with or even without palpation will reveal that there is a lessening in the subcutaneous tissue. It is thinner than below the second rib, or if it is confined to one side it is thinner than on the other side. Palpation either by feeling with the tips of the fingers or by picking up the tissues between the thumb and fingers will aid the eye very much in detecting this atrophy. This is an atrophy produced reflexly by some chronic inflammation in the lung, usually a tuberculosis.

2. Diminished motion of the side. The diagnosis of a pulmonary tuberculosis is strengthened very much by finding diminished motion present along with suspicious symptoms of other groups.

3. Rales. Rales heard on coughing or on inspiration following cough are valuable as indicating that inflammation is or has been present in the underlying lung, or pleura, or both. It requires considerable experience to properly interpret them and distinguish those in the lung from those in the pleura. Their presence,

however, no matter what their origin, gives evidence that the underlying structures are or have been the seat of inflammation. It is necessary to be on the lookout for rales in the tissues surrounding the hilum and toward the base as well as apex, for we find a great deal of tuberculosis starting in these areas of the lung.

4. X-ray. The x-ray is assuming a very important role in the diagnosis of chest diseases today. Many errors are being committed because of placing too much confidence in a film regardless of its quality. I see many films which are over-shot and underdeveloped, or overshot alone, in which the rays pass through without causing shadows even though sufficient disease to cause shadows be present. The best plate is a moderately soft one, developed carefully to bring out detail. Such a plate will aid greatly in diagnosis. A poor plate shows no more than a poor physical examination and the value of the two are on a par. Soft flaky shadows are most significant of active tuberculosis. They may be in any part of the lung but are most common above the third rib, not necessarily at the apex. They are often found near the hilus running out toward either the apex or base. Flakiness is present only when an area of softening or an allergic reaction is present. When this has passed away, as it will after a few weeks following a metastasis or re-inoculation of mild degree, the x-ray may fail to show the disease.

5. Tuberculin. The tuberculin test should always be used in case of doubt but more particularly should this test be used in those cases in which there is a suspicion of tuberculosis in children between the ages of 2 and 12 years as very often in this type of case, due to the vagueness of all symptoms complained of, there may be some small area or glands which are overlooked on physical or x-ray examination and only the tuberculin test will reveal these.

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## How to Handle Asthmatic Patients

THE LITERATURE of allergy is so copious that it is impossible for the general practitioner to follow up all of it, and very often modern therapeutic methods are so confusing that the physician finds himself at a loss. However, in my judgment, every physician who treats asthma and allied conditions should have a definite plan for handling such patients. I will endeavor to present the method which has proved most satisfactory for me, briefly, and without going into the discussion of the different theories, statistics, and technicalities.

First I want to stress the Jackson dictum, "All is not asthma that wheezes." True asthma must be differentiated from paroxysmal dyspnea caused by conditions of the larynx, trachea, chronic bronchitis, tuberculosis, neoplasm, bronchiectasis, and cardio-vascular diseases. There are numerous conditions, especially of nasal origin, which could be responsible for wheezing, and which should be detected before the physician commences special investigation.

The simplest classification of asthma divides cases into two groups: (1) cases due to extrinsic causes; and (2) those due to intrinsic. The first group usually affects adolescents and adults; the second, young children and elderly persons. This classification is not exact, however, as there are exceptions, but for practical purposes it can be of some assistance. I shall not try to enumerate all the wide varieties of sensitizing materials which may cause extrinsic asthma. The cause of intrinsic asthma should be sought within the body, usually in infections of gums, tonsils, sinuses, bronchial tree, gall bladder, appendix, ovaries, and other organs. Here again, it is the first duty of the physician to give a complete and exhaustive physical examination. I do not mean that every suspicious appendix

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or every doubtful gall bladder should be removed, but I do believe that after complete failure to find the cause of

asthma the physician has a right to consider an operation justified. There are numerous published reports which support this belief.

What is the mechanism in bronchial asthma? There are two: the first, spasmotic, characterized by broncho-spasm, is usually of non-allergic origin, and is caused by local irritants, psychogenic and endocrine disfunctions, and reflex of vagus excitants from the nose and other parts of the body. The second, exudative, characterized by broncho-edema, is of allergic origin and is caused by inhalants, ingestants, focal infection, and injectants (serums). Of course, there are many cases of mixed types, but this classification will ordinarily give a better understanding of the case and facilitate its handling.

In taking history the physician should always remember to take a complete record of familial allergy. "Hypersensitive parents commonly beget hypersensitive children; but it does not follow that the sensitization is due to the same substance in both," wrote Dr. Schultz (Ill. Med. Jour. 69:33), and this statement has been corroborated by many other allergists—Dr. Cook in particular. Questioning should not be limited to asthma, hay-fever, and hives, but details should be elicited concerning infantile eczema, idiosyncrasies to drugs, recurrent bronchitis, rhinitis, vomiting, and whether or not these conditions were associated with proteins.

A patient who gives a history of asthma should be asked for information concerning the month or season in which the attacks occur, if there are periodical catarrhal symptoms of nose and conjunctive, and what association, if any, there is between the onset of the attacks of asth-

ma and other diseases or operations. How surprisingly often asthma begins after nose or sinus operations! One wonders if the increase in the number of asthmatic sufferers could be a result of these operations? If so, the ENT men have a tremendous responsibility and should always keep in mind this possibility.

The asthmatic state should be traced from its beginning to the present, with especial reference to frequency, duration, time of attacks, effect of food, dust, changes of weather and seasons, effect of domestic animals, effect of hair, feathers, fur coats, blankets, and all other articles of this type. Very often knowledge of the occupations of members of the household, the location of the house, heating arrangements, proximity of stables, butcher shops, poultry markets, and factories will give important information. To illustrate the advantage of securing this type of information I wish to report the following case:

"A child, H., aged 4, had been suffering from asthmatic attacks for two years. The history failed to reveal anything of importance save that the father, who was a railway employee, had been transferred two years previously to a new station and had been obliged to rent a house on the outskirts of the village. After extensive questioning it was learned that a horse pasture was adjacent to this property. The mother was asked to pay especial attention to the wind direction at the time of the child's attacks and to consider a possible relationship between horse dandruff and the asthma. Subsequently she noticed that a wind from the direction of the pasture aggravated the attacks. Although it was evident from the history alone that the child was sensitive to horse dandruff, the complete scratch method revealed only one reaction, and that verified the above diagnosis."

Not all asthmatic histories, however, are as helpful as this one, for very often, in spite of painstaking history, nothing of significance can be discovered.

The physical examination should be thorough and complete. During fluoroscopy I look especially for signs of bronchiectasis, neoplasm of the lung, emphysema, and pathology of the heart. I also send patients to specialists for complete nose-throat examinations. If the examination proves absolutely negative, except for the usual well known findings for asthma, special tests are begun.

First, the scratch test is employed in an effort to rule out any hypersensitivity to common food proteins, inhalants, and epidermis, and if this is negative the intradermal test is made. When this fails to give a positive reaction, I occasionally use the opthalmic test. The problem of treating patients who give a definite reaction to the above mentioned tests is comparatively easy, for in the majority of these cases the patient's condition can be markedly improved, or entirely cured, by elimination of the responsible food protein or by careful and prolonged desensitization against the inhalant and epidermis.

"The physical examination of Miss M., fourteen-year-old high school girl, who had had asthma for four years, proved negative. She had noticed, however, being an observant youngster, that milk and pork usually aggravated her attacks. The scratch method showed a reaction not only to these foods but also a very marked one to goat hair. The rug in her room was found to be made of goat hair. After the rug was removed, concentrated milk substituted for raw, and pork omitted from the diet, the attacks ceased completely."

"Mr. R., aged 37, suffered from asthmatic attacks for four or five years. He gave a history of good health except for one 'touch of pneumonia.' The physical examination was negative, but the scratch method showed a marked reaction to mustard. Elimination of mustard from the diet stopped attacks. Incidentally, when the patient was told of the offending agent, he recalled that during his illness mustard plasters had been used

on his chest, mustard powder in his socks, and a home remedy containing mustard had been taken orally."

But what is to be done with the asthmatic case that does not give any positive reaction to exhaustive tests: First, I put the patient on special dietetic restrictions, so-called elimination diet, in the hope that something can be discovered by this simple procedure in spite of the negative tests. I believe there are numerous asthmatic patients whose scratch or intradermal tests are negative but whose offending protein can be elicited in this manner. The following case will illustrate my point:

"Mrs. F., aged 75, had been suffering from chronic bronchitis for forty years. It had gradually become worse with more pronounced and typical asthmatic attacks. It took us almost four months to find out that herring was responsible. The old lady at first refused to blame herring, but later proved to herself that the diagnosis was correct. She still has bronchitis, but now without asthmatic attacks."

I also give instructions at this point of procedure regarding the preparation and maintenance of a dust free room and recommend allergen proof encasings for beds and pillows. Failure of elimination diet should not discourage the physician; he should relentlessly continue his search for the cause.

It is a well known fact that bacteria plays some part in producing asthma, and my next step is to eliminate such a possibility. The patient is instructed to collect sputum during his attack, and this is sent to the laboratory for vaccine (1 per cent strength). It is my rule, in sending this specimen to the bacteriologist, to inform him of my suspicions and ask him to look for the prevalent bacteria. A minute dose of this vaccine is then injected intradermally. If the patient does not give a reaction, the vaccine is discarded, but if, on the other hand, a positive reaction results, it is diluted and gradually increased doses are given for

immunization. Try to avoid marked general reactions. This is a different method from that in which we use a stock vaccine as a non-specific protein when local and general reactions are deliberately produced). Here might be of interest the work of Rawlings (Southwestern Medic. 19:288, 1935) who found Pertussis bacilli on the pharyngeal walls of 4 adult asthmatics. Sauer's pertussis vaccine gave very good therapeutic results.

Works of W. Anderson, D. P. Cole, M. J. Mandelbaum, and Ramirez definitely prove that injections of lipiodol are very beneficial to asthmatic cases. This applies not only to patients with bronchiectasis but also to those without. The procedure is simple and harmless and certainly warrants its use. 20 cc. of warm lipiodol injected through the trachea at weekly intervals has given excellent results in my cases. (Don't fail to test the patient's tolerance to iodine before injection). According to W. Anderson (N. Y. St. J. of Med. '36:1151, 1936) the oil "stimulates the secretory glands causing them to excrete large amounts of normal secretion which increases the fluid contents of the tubes. It dissolves the mucin in the secretion, renders it less viscid and more fluid, thus making possible its elimination by the bronchial drainage mechanism. It stimulates the bronchial mucosa, decreases congestion, absorbs, exudates, and restores the normal circulation. The rapid decrease of the bacterial flora from the sputum indicates its bactericidal action.

"It is also of value in forming a protective film over the surface of the mucosa, which prevents irritation by dust drying and the entrance of bacteria. Its high iodine content gives it a specific gravity much greater than the bronchial secretion. Immediately after the injection, it gravitates to the most dependent portion of the tubes, dislodges and displaces the secretion upward into the large tubes, where it is eliminated by the cough reflex."

"Captain B., aged 65, had been suffer-

ing from periodic asthmatic attacks for eight years. They finally became so severe and frequent that he was making constant trips to the hospital. After the failure of my usual procedure, I gave him lipiodol, and for the past twelve months he has suffered no attacks. He himself now knows when he needs the next injection and comes once every four or five weeks for treatment. A chest x-ray did not show anything abnormal except a small bulging just below the secondary bifurcation of the right bronchus."

When lipiodol fails to bring relief, I continue my investigation by sending the patient to a bronchoscopist to ascertain whether or not there may be some ulceration or other pathology which could not be detected by ordinary physical methods or x-ray, and which might be responsible for the condition. During the examination secretions of the bronchus are collected, and another vaccine is made in order to be one hundred per cent certain that bacteria are not the cause. As the irritability of mucous membrane is lessened by painting with silver nitrate, bronchoscopy affords an opportunity for the application of this treatment to the carina and distending bronchi, and it should be done at this time, by all means.

If, in spite of everything, the cause of the asthma continues to elude us, we should begin an investigation of any pathology, previously mentioned, which was discovered during the initial examination, and which could be a focus of infection. Work has been done by French investigators which has proved beyond doubt that endocrine disturbance, namely ovarian, very often produces asthmatic attacks. This should be kept in mind since a correction of the disturbance, according to their opinion, can eliminate attacks.

Even after exhaustive study the cause of asthma in a great number of cases may still remain unknown, and yet these patients need relief from their suffering. After all, a patient does not care what the cause may be, he wants relief, and it

is the physician's duty to give it. Here the judicious appliance of modern methods can be of some assistance.

Treatment should be divided into two categories; one is concerned with immediate help, the second is prophylactic. Adrenalin is one of the most effective medicines for treating asthma. Balyeat, in his recently published book, *Allergic Diseases, Their Diagnosis and Treatment*, writes: "In the medical armamentarium at our command for the relief of asthmatic symptoms, adrenalin is by far the most efficacious for rapid symptomatic relief and is probably the least harmful of all drugs used by the asthmatic patient for temporary relief. An ideal drug for temporary relief of asthmatic symptoms is one that will relieve the patient quickly and seldom produce untoward symptoms. Adrenalin chloride solution 1:1000 given hypodermically in 5 to 10 minim doses affords prompt relief in the majority of cases, and in only an occasional case we find uncomfortable symptoms, such as headache, nervousness, etc., unless the drug is given frequently. In our experience, it is without question the drug 'par excellence' for the relief of asthmatic attacks."

Dr. James B. Graeser and Dr. A. H. Rowe introduced a new method of giving adrenalin by inhalation for relief of asthma. Since their publication, 1:100 solution of adrenalin has been used extensively with good results. It obviates the pain and bother of hypodermic injections, is easy to administer, and gives the patient a feeling of security, thus eliminating the great factor of neurogenic and psychogenic influence. Use of this solution requires only a special all-glass atomizer which delivers an even vapor-like spray free from droplets.

Dr. Hurst suggested that, when no relief is obtained from subcutaneous injection or inhalation of adrenalin, the so-called continuous method should be used: 2 minims of adrenalin 1:1000 injected intravenously every 3 minutes up to a maximum of 15 minims. One grain of

caffein sodium salicylate may be injected also in connection with the adrenalin. Pituitrin very often aids the action of the adrenalin. It is the consensus of opinion that morphine should not be used in asthmatic cases, but there is no doubt that many patients have been relieved only by such injections. Atropin is of especial value in cases of nervous origin.

Inhalants, such as fumes of stramonium leaves, are in common use, but their action depends upon their atropin content. In my experience they have proved of temporary benefit, but they leave the bronchus more sensitive than before and should not be used too often. Frequently the early beginnings of an asthmatic attack can be helped by administering a few drops of ephedrine inhalant in the nostrils. Capsules of ephedrine, in my opinion, are of little value.

In status asthmaticus, when all other treatments have proved ineffectual, deep anesthesia will give the patient much needed rest. Oil by rectum will many times answer the same purpose. I have used a small dose of avertin in a few selected cases with good results.

In carrying out prophylactic treatment I usually give the patient a general outline for his mode of living: he is instructed as to the importance of regular exercise, stimulation of skin by cold bath or sponging, and deep breathing exercises. Forced expiration and humming are particularly emphasized. I suggest that he keep a diary of his daily living routine, for this occasionally reveals some salient angle of the situation. To improve protein digestion, meat extract and alcohol before and during meals seem advantageous due to their stimulation of gastric secretions; on the other hand, fat and excessive consumption of carbohydrates are to be avoided. A ketogenic diet, consisting largely of meats, eggs, certain green vegetables, and broth, is very helpful. Every attempt should be made to regulate the bowels, evening meals should be avoided, and a day's starvation per week is to be recommended.

Non-specific desensitization (injection of peptone, tuberculin, milk, stock vaccine) have been used in a limited number of cases with conflicting results.

Hydrochloric acid, intravenously or by mouth, which has been so enthusiastically advocated, has proven of no value in my cases.

Autohemotherapy was also useless.

Calcium and peptone by mouth was most unsatisfactory, except in a very few cases.

Sodium iodine and potassium iodine rarely gave good results.

In patients with slow pulse and dry skin, a small amount of thyroid extract may bring general sympathetic stimulation and some relief.

Intravenous injections of glucose, which assist the liver in dealing with abnormal proteins and fatty acids, are of some value.

Sympathectomy and injections of alcohol into the dorsal spinal nerves have their advocates.

Ultraviolet light, according to Day (*Brit. Med. Jour.* 3913:8, 1936) gives very promising results.

Barach (*Ann. Int. Med.* 8:739) has used a mixture of 80 per cent helium and 20 per cent oxygen with some satisfaction, but this treatment is expensive and requires considerable equipment.

X-ray treatment of severe asthma, according to C. K. Maytum and E. T. Leddy (*Jour. of Allergy* 8:66-70), Nov. 1936), brought symptomatic relief lasting many months to five of twenty-three patients with whom other measures had failed, and fifty per cent to seventy-five per cent relief lasting from three weeks to two months to eight more sufferers. Personally, I have had no experience with this method.

Short wave therapy has been used quite often in the last two years, and while I have had dramatic results in a few cases, others have been only encouraging.

These various therapeutic methods are  
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# The Relation of the Sanatorium to the Treatment of Tuberculosis

WITH the discovery of the tubercle bacillus in 1882, the world believed tuberculosis as a disease affecting mankind

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had been as effectively conquered as had smallpox after the introduction of vaccine by Jenner. Dr. Trudeau had sought the Adirondacks where he proved at least his life was not to be snuffed out in the twinkling of an eye, and later established the Cottage Sanatorium for the treatment of tuberculosis. Here he proved by the trial and error method that rest plus good food and fresh air could arrest the disease in a fair percentage of patients. He learned in the school of hard knocks what is common knowledge today, but lived to give all who came after him a comprehensive knowledge of the disease, and the fundamentals in its treatment.

Climatic treatment of tuberculosis had been empirical up to this time, and patients have been advised to change climates as far back as records can be traced. Mountains, seashores, and deserts all had their day, but it was Dr. Trudeau's experiment in the Saranac Lake section that started the country on a sanatorium-building period which ultimately placed sanatoria in practically every state in the union.

The Southwest and the western seaboard saw the majority of private institutions built, while the East began the erection of state and later county and municipal sanatoria. The movement spread like wild-fire and the modern treatment of tuberculosis was begun in earnest. Again we were behind Europe, but once the movement started we outstripped them in things accomplished. In the mad race to build home institutions, climate was forgotten and the slogan "Stay at home and be cured" cut the percentage of climate chasers to the minimum. However, up to the world-wide chaos of 1929 those who could afford the luxury of climate still

kept the health resorts full to overflowing. Then the crash, and with it the empty pocket-books. The home institution came into its own. By home institution I mean the state, county and municipal and not the private sanatorium; that suffered along with its climatic relative. People flocked to the place that made possible a cure with little or no expenditure of money, and the wails of the private sanatorium owner both east and west mingled in one mighty cry, that still echoes from Maine to California and from Canada to the Gulf. But more about this later. These individuals have a real grievance.

In the early days the sanatorium treatment consisted of rest, good food, fresh air and expert supervision. There was little else to offer a patient. The progress of the disease had to be watched and the prognosis given by what the clinician could gather from physical examination and clinical symptoms alone. The advent of the x-ray and the various laboratory tests for determining activity and the progress in general were yet to come.

For the sake of close supervision, patients needed an institution and were more successfully treated there inasmuch as their regime was outlined for the entire twenty-four hours, and, what is more to the point, someone saw that this routine was carried out. When one asks for an argument relative to the value of sanatorium over home treatment and the questioner has stated that he will follow the same advice on routine at home, tell him it has never been done and that the proof of the pudding is in the eating—sanatoria can boast results that were never dreamed of by home treatment.

My personal experience also bears out this statement. For eighteen years I was directly connected with institutions, most of those years as medical director. For

the past twelve years I have been doing private practice. For satisfaction from all angles, the institution is far superior. In order to offset the disadvantage of private work, I attempt to place all patients in the beginning under sanatorium care in our so-called open institutions. Here we have nursing supervision and routine is carefully looked after. Still I firmly believe that a sanatorium with a medical director in charge is preferable.

I have attempted to show that in the beginning the sanatorium was a necessity for properly carrying out the rest regime. Nor has the advent of collapse therapy made it of less value to the patient who has just been given his diagnosis, and must be started on his tuberculosis education. Education of the tuberculous is best accomplished in the institutions. There is no more comparison between the sanatorium-educated patient and the home patient than there is between the correspondence school pupil and the student of a recognized university. The one is as handicapped in his fight for continued health as the other in his struggle for economic existence.

Collapse therapy has changed the attitude of many specialists in tuberculosis toward the sanatorium. In many cities, patients are given artificial pneumothorax at dispensaries and allowed to continue work in the early months of treatment. The lay magazines are making much of this "new cure" for tuberculosis. Even medical men are carried away by the spectacular results obtained, with the inevitable result that the average patient thinks if he or she can have a pneumothorax needle thrust into the pleural space or a phrenic nerve pulled out of his anatomy, his troubles are immediately at an end and the longed-for cure accomplished.

I realize as keenly as any of my colleagues that economic situations alter cases, and what can be done for an individual in one stratum of economic life cannot be done for one in a lower. Many times a patient comes to my office with

barely enough money to buy bread. He has reached the desert, chasing a will o' the wisp, hoping the dry air will restore a worn-out physique and the sunshine will contract a cavity which occupies a third of his lung. That man must have something done for him. There are no charitable institutions in New Mexico, but there are people running sanatoria with the milk of human kindness tucked away inside. I put this patient to bed for a period long enough to collapse the bad lung and let him work. No doubt the dispensary care in large cities I referred to comes under the same classification. Something must be done for that type. By collapse therapy we have made it possible for this patient to resume his occupation and if the collapse is complete, rendered him no longer a menace to those with whom he may come in contact.

But when we advocate this type treatment it is because of economic necessity. It is not the ideal in compression therapy. It's a make-shift and must be looked upon as such. A collapse of a lung does not cure tuberculosis; it merely gives nature a chance to effect a result. It's unfortunate that medicine is penalized and forced into make-shift methods by a society that penalizes human beings and makes it necessary to offer half-way measures to prolong downtrodden lives.

To those more fortunate individuals, time makes for much better end results. They can and should be advised to enter a reputable sanatorium. There under proper conditions the patient has the advantage of study and when this study is complete, sane advice can be given as to methods of treatment. It may or may not be some form of collapse but if collapse it is, then continued residence in the institution of choice makes for a successful outcome.

We have spoken of pneumothorax and I think hinted at phrenic exaresis, but have not touched on thoracoplasty—which brings us to major surgery and therefore calls for a discussion of the sanatorium properly equipped for all

types of collapse treatment. The institution of early days needed a well-appointed kitchen, an attractive dining room, a recreation hall, and units for the accommodation of patients. Perhaps an infirmary could be found in a few if one searched long enough. A laboratory was a necessary adjunct for the routine examinations; later, x-ray machines became a necessity, but until recent years many plodded along with meager equipment. Now if an institution gives the best that is possible in the care of the tuberculous it must add a surgical unit or have access to a general hospital in a relatively short distance from the sanatorium grounds, so that the close cooperation between surgeon and tuberculosis specialist may exist, for this relationship or lack of it spells many times the difference between success or failure.

Where surgical units or access to nearby hospitals are lacking, it becomes necessary for the patient to travel long distances and to be placed in the hands of a surgeon who knows nothing of the individual except that some doctor wants his ribs removed. In the final analysis the medical man is the one whose judgment prompted the operative advice, and the successful chest surgeon is the man who understands this fact and works in close association with his medical colleague.

I now come to the last phase of this discussion. What of the private sanatorium and its struggle for existence? Where will this struggle end? Unless something is done to meet the situation, the answer is failure. There can be nothing else under existing conditions. The state, county and municipal institutions are taking the private patient at the expense of the privately owned sanatorium. The man who owns his institution should have some protection. He along with the rest of the tax-paying group is helping support the institution that is forcing him into bankruptcy. When these institutions were built it was the opinion of most of us, I believe, that they were for the care

of indigents or people who could ill afford private sanatoria. If we were right in this opinion, then time has changed the purpose for which they were erected. Now anyone can enter these institutions and get away with it. The waiting list is long, and in many, patients wait months before there is a vacancy. Often this prolonged wait spells failure to regain health. And yet nothing is done about it.

It all resolves itself into the present-day agitation for lower cost for medical care—a problem which merits careful consideration, another entering wedge for state medicine which is fast becoming a reality in one form or another. Let me digress long enough to say that I have no quarrel with state medicine per se, but I do object to practicing state medicine in a capitalist society. No group should be singled out and legislation enacted to cover that particular group. As long as the profit system exists, doctors should be given the same chance that our government extends to the magnates of industry.

But we are not dealing with economics. We must suggest something constructive for the private sanatorium owner. In New Mexico we are without a state sanatorium. For years we have recognized the fact that something must be done for the indigent who is a resident of the state. Our present plan backed by the State Board of Health and all health agencies is to get a sufficient appropriation through the legislature to place these people in existing institutions. In that way, overhead can be cut and empty beds can be filled. It seems to me that by concentrated effort on the part of individuals and associations such as this some pressure could be brought to bear on all existing state, county and municipal institutions to force them not to accept patients who are able to pay for private sanatorium care. Further, rather than have more expenditure of state monies to add beds to already existing institutions, awaken sen-

(Continued to page 24)

# Tuberculosis in the Aged \*

IN JUDGING the frequency and severity of tuberculosis in the aged, one finds himself dividing his study into three parts, as outlined below:

1. Literary findings,
2. Necropsy findings, and
3. Personal findings.

## *Literary Findings*

Thanks to Herbert R. Edwards, M.D., director of the New York bureau of tuberculosis, this study has a real bibliography. Excerpts from his leads follow:

J. A. Myers <sup>1</sup> summarized his screed as follows:

1st. Thirty-five tuberculous individuals whose ages ranged from fifty to eighty. Tubercle bacilli were found in all.

2nd. In nine there had been definite exposure.

3rd. Thirteen descendants had tuberculosis.

4th. Symptoms dated from six months to forty-five years, and he warned us that, "Tuberculosis in the aged is a great problem. Its greatest danger being its mildness."—That being true, tuberculosis is kind to the aged!

William H. Meade <sup>2</sup>, another lung specialist, concludes his paper with, "There has been a laxity in the recognition of phthisis among the elderly; it is a potent menace to public health work; and the problem is not only one of custodianship and segregation, but includes active care and even collapse therapy when necessary."—I dare to opine that collapsing an aged adhesive pleuritic tuberculous lung in an elderly mother or father would be, if effective, rather rough treatment.

BY

JOHN W. SHUMAN, M.D.  
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Andrew L. Banyia <sup>3</sup> finishes his article thus:

1st. Tuberculosis in the aged is not rare.

2nd. Appearance of health does not exclude it.

3rd. Forty-three and one half per cent of our elderly tuberculous patients had lung hemorrhages although fibrotic lesions were most common.

4th. The course of the disease was more prolonged than in younger subjects.

Every now and then an occasional case report appears, e.g., D. A. Chamberlain <sup>4</sup> reports an eighty-five year old woman who had "positive" sputums and Boris M. Fried <sup>5</sup> reported an old man who had active tuberculosis.

Well, here is one of mine:—a sixty-nine year old widow from Florida was examined August 3rd, 1935. She complained about a 4x4 cm., firm, tender nodule in the base of her right neck. She had lost much weight over a period of seven months, during which time the lump had been treated by x-ray. The patient, relatives, and her nurse were sure that it was cancer. I did not know, so we had Edward Ruth remove it at the Hollywood Hospital. Pathologist Andrews reported, "a tuberculous gland." The wound drained for two months. Tubercle bacilli were found in the exudate. The patient gained twenty pounds in the next nine months, no doubt because her mind was relieved of cancer. Then too, the lessening of her load of active glandular tuberculosis did not hurt her.

## *Necropsy Findings*

When W. L. McNamara, pathologist of the National Veterans Hospital of West Los Angeles, was consulted about the subject, "Tuberculosis in the Aged," he replied, "Active tuberculosis in the aged is a negligible quantity." After due consideration of several months he saw no logical reason for changing that statement.

\*Contributed by request to the Rocky Mountain Tuberculosis Conference, Albuquerque, Sept. 28-29, 1936. From the Depts. of Int. Med., College of Medical Evangelists, and the U. S. Veterans, and Hollywood Hospitals.

He also informed me that the U. S. Public Health Department will not accept nurses under thirty years of age, because after that they are considered practically immune to tuberculosis.

Vernon L. Andrews, pathologist of the Hollywood Hospital, reviewed one hundred and nine necropsy protocols held during 1935, and found that he had recorded tuberculosis in thirteen who averaged a little over sixty-six years of age. Twelve were "healed" and died from other causes. In only one, a male aged sixty-nine, was active tuberculosis found; less than one per cent of the 109. A glance through his table shows how some aged people tolerate tuberculosis in Sunny California.

## Necropsy

| Date  | Ages | Tuberculous Incidents                            | Status |
|-------|------|--------------------------------------------------|--------|
| 2-35  | 71   | Tbc lungs and lymph glands                       | Healed |
| 10-35 | 50   | Calcified tbc left lung and peribronchial glands | "      |
| 11-35 | 77   | Apical tuberculosis                              | "      |
| 26-35 | 55   | Calcified tbc nodules of lungs                   | "      |
| 44-35 | 65   | Calcified tbc nodules of right lung              | "      |
| 46-35 | 69   | Tbc left adrenal                                 | Active |
| 50-35 | 50   | Calcified tbc glands of mesentery                | Healed |
| 58-35 | 83   | Tbc left lung                                    | "      |
| 63-35 | 60   | One calcified tbc peribronchial gland            | "      |
| 80-35 | 80   | Calcified tbc peribronchial gland                | "      |
| 94-35 | 70   | Old tbc of peribronchial glands                  | "      |
| 95-35 | 63   | Calcified tbc peribronchial glands               | "      |
| 97-35 | 72   | Tbc of apices                                    | "      |

Frederick Proescher, pathologist of the San Jose General Hospital, wrote September 1, 1936:

"I have just checked up on seven hundred and fifty necropsies, ages sixty to ninety-eight, one hundred and twenty-four of which showed tuberculous findings. Only twenty-six of the one hundred and twenty-four, or one-third of one per cent, had active tuberculous lesions. Of these, seven were between 60 and 65—seven between 65 and 70—two between

70 and 75—four between 75 and 80—three between 80 and 85—one aged 88, another 93, and still another aged 97!"

*Personal Findings*

Back in Iowa forty years ago, the facilities for diagnosing were not so efficient as they are to-day. It was then that grandma M. passed on from what our dear old country doctor diagnosed, "Consumption." She hacked and spat about a half-pint of sputum every morning the last ten years of her life—ever since an attack of "lung fever". She also had severe crippling arthritis with clubbing of her finger ends. None of her descendants have developed tuberculosis. Therefore, what she probably had was "osteo-pulmonary arthritis" secondary to a bronchiectasis.

A review of seventy-five necropsies held during intern days in the Allegheny General Hospital (1910-11) with Frederick Proescher, shows that eighteen were past fifty—the age when geriatrics, or the medical care of the aged, begins. All of their lungs were more or less anthracotic from inhaling the coal-soot-laden air of Pittsburgh. Healed or arrested tuberculosis as exhibited by fibroses and calcified bronchial lymph nodes were common incidents. However, active lesions were very rare. Those post-mortem examinations were made in the days when we were taught that eighty per cent of us had had tuberculosis in one form or the other before we reached the age of twenty and that we had secured a "cure" without diagnosis, prognosis, or treatment other than that afforded by nature.

"A review of forty-three necropsies" in 1920 of Sioux City, Iowa, for the Missouri Valley Medical Society, found that seven died from active tuberculosis and that their average age was thirty-five years.

"A survey of two hundred consumptives" of the same locality (1912-22), for the Iowa State Medical Society showed that their average age when diagnosed was thirty-one; and that sixty-four died,

their average age at death being thirty-seven.

Lawrason Brown quoted in that study previously written for Osler's medicine that, "The average length of life of the active chronic consumptive is about six years."

A study of *Medicine in Syria* (1922-23), for the *New York Medical Journal and Record*, showed that thirty-four of the five hundred hospitalized patients had far-advanced active pulmonary tuberculosis with an average age of thirty-four years; and that fourteen of them died that year.

The above only goes to show that un-arrested active tuberculosis saves its owners from the complications of high-blood pressure, parkinsonian tremors, menopause horrors, and prostatism.

A search through the dead file at the office for the last thirteen years found that it contained three hundred and sixty-six records; one hundred and ninety-four of which average the age of sixty-three; that post-mortem examinations were made upon thirty-eight, and active tuberculosis was encountered by V. L. Andrews in only one. This activity was marked and in the right upper lung of a sixty-seven year old man who died from lung hemorrhage. His physician, Edward Ruth, and the author treated him twenty-four hours for right lobar pneumonia! However, the remarkable thing was that the fatal bleeding came from a bronchogenic carcinoma of the right lower lobe!

Which recalls that right here in Albuquerque, fourteen mistakes in diagnosing intra-thoracic pathology were confessed eight years ago before the South-western Medical and Surgical Association; but we forgot to relate that in 1924, in Ward 155 of the Los Angeles General Hospital, a sixty-four-year-old actor died from lung-trouble—diagnosed tuberculosis by some of us, and syphilis of the left lung by others, the latter on account of a four plus Wassermann. He had lost weight, had fever, spat blood, and had physical signs of chronic pneumonitis in

the left upper lobe which the x-ray confirmed. After death, George Maner found a metastatic cancer in the left lung which originated in the right kidney. Therefore, let us bear in mind malignancy when diagnosing lung pathology in the aged.

Many are the causes for lung failure other than tuberculosis. During the past thirteen years some of us in Southern California have had to learn about coccidioides. One aging colored Veteran was clinically diagnosed, and mal-treated for syphilis. The post-mortem diagnosis was "miliary tuberculosis". One month later the microscopic slides were re-examined and the correct diagnosis of "Coccidioides" established.

In passing it may be mentioned that healed contracted leathery tuberculous apices were found in the aged after death, by our fore-fathers in medicine. Also that autopsies are not the style, even to-day, on account of laziness, and indifference on the part of physicians, and the ignorance, superstition, and Mosiac laws of the laity. Then too, we must not be blind to the fact that, "What we go out to seek that we will find." The laryngologist sees chronically infected tonsils; the proctologist—active hemorrhoids, and the chest specialist—active tuberculosis—too often where they are not.

### Conclusions

That is the way tuberculosis in the aged impresses us to-day. When we interrogate physicians who have been in practice from thirty-five to fifty years, all can recall one old man, or one elderly lady who really had active tuberculosis. They also state that there were many others in whom they suspected it, but x-ray, microscopic, and autopsy evidence was lacking.

When the next text book on geriatrics is written, its chapter on tuberculosis will contain the following: active tuberculosis is only occasionally encountered in folks past fifty years of age, much less than

(Continued to page 28)

# When Not to Use Sun Treatment in Pulmonary Tuberculosis

THE PURPOSE of this paper is not to cover the whole subject of heliotherapy in tuberculosis, but only to discuss a few practical aspects of it, with emphasis on contra-indications.

So much has been said about the value of sunlight in tuberculosis that sunbaths are often prescribed as soon as a diagnosis of pulmonary tuberculosis has been made. This is most unfortunate, as direct exposure of the unclothed body to the sun is injurious in many cases. Indeed, I believe that it is a mistake to give sunbaths to a patient beginning treatment for active pulmonary tuberculosis.

It is true that among experienced phthisiologists some will employ heliotherapy more than others. There will be a difference of opinion as to its advisability in certain cases, but there is a very general agreement that the patient with a markedly active exudative pulmonary lesion should not be exposed to the direct rays of the sun. Most patients with tuberculosis, especially adolescents and young adults, when they first come under observation, have this type of lesion. Furthermore, sun treatment should not be given to a patient who has had a recent hemoptysis, and usually not to one with any fever. These contra-indications apply equally well to treatment with a powerful ultraviolet lamp, and if the individual with progressive lung disease goes to the doctor's office for the lamp treatment, he is harmed not only by the ultraviolet rays, but also by the frequent trips downtown when he ought to be resting.

Very often a history is given of the occurrence of hemoptysis or of increased cough and fever after the use of heliotherapy during the early active stage of the disease. These unfavorable developments follow heliotherapy so frequently that I believe they cannot always be at-

BY  
LEROY ELRICK, M.D.  
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tributed to coincidence or the natural course of the disease, but am convinced that the exposure to the sun's rays must be considered the cause of some of them.

In starting a new patient on treatment for tuberculosis, the first thought should be of rest, not of sun.

Heliotherapy is of great value in tuberculosis of the bones, lymph nodes, and other extra-pulmonary structures, and the exposure to the sun of a limited diseased area, such as a discharging cervical lymph node, or a rectal fistula, may be done without regard to the chest condition. Also, when the need for sun treatment is rather imperative, as may be the case in intestinal tuberculosis, it is sometimes advisable to try it in spite of moderate activity in the chest.

As a general rule, the kind of pulmonary case in which heliotherapy may be beneficial is one which has undergone a year or two of rest or collapse treatment, so that the disease is quiescent, and fibrosis is developing. Contra-indications, such as recent spread of the lesion, fever (due to the lung condition), or recent hemoptysis, should be absent. Even then the sun should be used cautiously, and the exposures reduced in length or stopped if any deleterious effects, such as increased temperature or pulse rate, undue fatigue, or anorexia are noticed. A convenient method of applying heliotherapy is to start with an exposure of one minute to the anterior surface of the body and one minute to the posterior surface, from the waist down. The time of exposure is then increased by one minute to the front and one minute to the back daily, until a total time of one or two hours is reached. If the course of treatment is interrupted for a few days by cloudy weather the next exposure should be shortened somewhat, and the following ones gradually lengthened.

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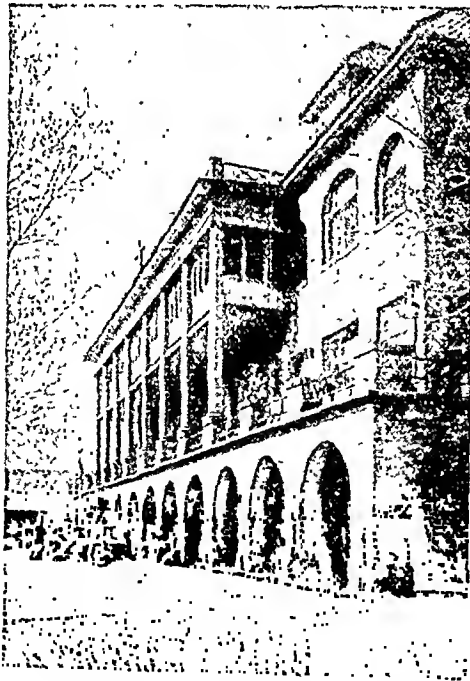
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Special care must be taken with certain blonds, whose skins are inclined to burn instead of tan. They may never stand more than a few minutes exposure, and in some such individuals the treatment may have to be abandoned.

In a high altitude, where the air is usually clear and the sunlight intense, it seems probable that exposure of the body below the waist is sufficient for maximum benefit, though some physicians expose the chest also. In localities where the air contains much mist and smoke, which absorb many of the ultraviolet rays, it may be advisable to expose more of the body or to lengthen the time, in order to obtain the desired dose of the rays.

On a warm summer day the sunbath is preferably taken early in the morning, especially when this treatment is just being started. In any case, exposure to the hot sun should not be long enough to cause any real discomfort. Sometimes patients who dress and sit a long time in the sunshine obtain unfavorable re-

actions from overheating with the infrared rays, although their clothes protect them from most of the ultraviolet light. Those confined to bed and receiving no sun may be given codliver oil or viosterol to prevent vitamin D deficiency.

Patients often remark that they feel better on clear sunny days, and those of us who practice in relatively dry regions believe that such weather is a help to them, both physically and mentally. But this general tonic effect of indirect sunlight is an entirely different matter from the direct exposure of the body to the sun's rays. The invalid's room should be bright and sunny, as no doubt such diffused ultraviolet light as is reflected into the room is beneficial.

### Summary

(1) Sunlight is a powerful remedy, to be used with discretion.

(2) As a rule, patients with active pulmonary tuberculosis should not have their bodies exposed to the direct rays of the sun.

### THE RELATION OF THE SANATORIUM TO THE TREATMENT OF TUBERCULOSIS—(Cont. from P. 18).

timement for such plans as New Mexico is attempting and which is already being done in Colorado, Texas and I suppose other states.

Further than this I have nothing constructive to offer, but I still feel that

collective effort by such organizations as ours may in time bear fruit and if such effort proves wasted, the private sanatorium will live only in the memory of pioneer workers in the field of tuberculosis.

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## EARLY TUBERCULOSIS—(Continued from page 10).

*Summary*

1. By carefully taking the clinical history and classifying the symptoms according to their etiology, and assigning to those present their combined value, one can make a probable diagnosis in nearly all frank cases of early clinical tuberculosis.

2. The sputum should always be examined, no matter where the patient thinks it comes from. A twenty-four or forty-eight hour specimen should be examined in all cases where the amount raised is small. Examining by one of the methods which concentrate the bacilli will show their presence in many instances where they are not found by the smear method.

3. Areas of atrophy of the soft tissues over the thorax should be looked for because they tell of previous inflammation in the underlying lung and pleura.

4. Diminished motion of the chest wall on one side is present in all cases of unilateral active clinical tuberculosis.

5. The x-ray is a great aid to diagnosis. Many plates on which an opinion is given are so poor that they are not only valueless but harmful. A moderately soft plate, carefully developed, is most dependable. A negative film does not imply the absence of disease.

6. Rales may indicate the presence of active disease in the underlying lung or pleura, or of a chronic or obsolete process. They must be interpreted in conjunction with other symptoms. Those who examine chests for early tuberculosis infrequently should disregard all rales except those which are of a definitely moist nature.

7. All cases in which there is a suspicion of tuberculosis which cannot be proved otherwise should have a tuberculin test made.

## HOW TO HANDLE ASTHMATIC PATIENTS—(Continued from page 15).

numerous, but one can readily see that but few are practicable. Asthma is a challenge to medicine. Unfortunately, the medical profession is at fault to a certain degree, for neglect of early radical treatment and a superficial attitude lead to the development of more complicated conditions which are more difficult to cure.

In conclusion I want to emphasize the importance of remembering that asth-

matic work requires long, tedious labor, special training in interpreting the results of different tests, a realization of the necessity for "team work," kind, sympathetic, and understanding handling of these sufferers, and above all, a thorough knowledge of internal medicine.

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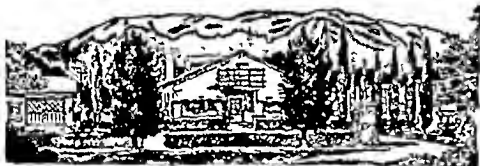
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## TUBERCULOSIS IN THE AGED—(Continued from page 21).

one third of one per cent. When active tuberculosis does occur in the aged it is nothing but a reactivation. When present, it affects any part of the body, chiefly the glandular structures. Its course is always milder and is more prolonged than in younger subjects. Nevertheless, it should be recognized whenever present and so managed that the affected one does not suffer unnecessarily and others become infected. The most rabid anti of

regular medicine admits that active tuberculosis is contagious and desires that it be curbed.

- (1) Amer. Rev. of Tbc. 21 pp. 555, "Tuberculosis in the Aged."
- (2) Mich. State Med. Soc. Jour. 35, 4, pp. 233, 4/36, "Tbc. in the Elderly."
- (3) Amer. Rev. of Tbc. 21 pp. 577, "Tuberculosis in the Aged."
- (4) B. M. Jour. 2, pp. 565, '28. "Phthisis at the age of Eighty-five."
- (5) New Eng. Med. Jour. 200 pp. 233, '29. "Hilum tbc. in an Old Man."

—————(o)—————

## ABSTRACTS

**Active Pulmonary Tuberculosis Without Symptoms**—GEER, EVERETT K.—*Minnesota Medicine*, 19:769-774 (December) 1936.

Active Pulmonary tuberculosis without symptoms occurs frequently as the silent progressive parenchymal lesion found not uncommonly in young adults. The typical case is illustrated by the person who feels perfectly well, presents no symptoms whatsoever, may give a history of exposure to an individual known to have positive sputum, or who has been sifted out in a Mantoux survey or has been tested by his physician in the course of a routine examination. He does exhibit a positive reaction to a skin tuberculin test and is found to have an infiltration in the chest roentgenogram usually in the first or second interspace. Rarely will these people have any abnormal physical signs in the chest.

This type of lung disease can easily lead one to regrettable conclusions. Because symptoms are absent there is a strong temptation to assure the patient that he has "only a small spot on the lung," that x-ray shadows by themselves do not produce illness, that he has no fever, has lost no weight, has no cough and therefore cannot have active tuberculosis requiring treatment or even observation. Stories such as these are not unusual. The picture which presents itself months later is one which requires prolonged treatment with an uncertain result.

The behavior of these early symptomless lesions is unpredictable. Some will regress without treatment. Others will be dis-

covered and with observation will be found progressive and with bed rest will clear in a satisfactory manner.

Still others will pursue an indolent course for months or years and then within a comparatively short time will develop fulminating disease.

How should one manage persons with symptomless tuberculous lesions in the lung parenchyma? To lay down a single rule for all such cases would be arbitrary, in many instances unwarranted and in some disastrous. If we are dealing with people such as hospital employees, students in schools with adequate health service facilities or individuals who will intelligently cooperate by reporting for necessary re-examination, in many instances it will be safe to permit continuance of usual activities if frequent chest roentgenograms are taken.

If the person with the silent parenchymal lesion is not in a position to be watched closely, or if he is the type of person who is prone to hide his head in the sand and disregard sane advice, a period of sanatorium observation should be urged and in no uncertain terms. This, beyond doubt, is the ideal method of handling such individuals so that nothing is left to chance. And here, again, serial roentgenograms are essential to know accurately which way the wind is blowing.

If the infiltration decreases, a watchful waiting policy should be pursued. If with bed rest in increase in the lesion is noted, collapse therapy should be considered, and

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for those whose lesions progress, artificial pneumothorax without delay is imperative. But for the symptom-free, nonprogressive case, pneumothorax is clearly not indicated

without a period of observation.

When collapse treatment is advisable, it should be induced in a hospital or sanatorium and not in one's office.

**Danger Signals In Artificial Pneumothorax Therapy**—MACKEY, W. M.—*American Review of Tuberculosis*, 34:808-814 (December) 1936.

The practice of artificial pneumothorax in the treatment of pulmonary tuberculosis, while generally considered to be a comparatively simple procedure, is not without danger to the patient in view of the fact that accidents sometimes occur during the administration of the treatment; and, while probably unavoidable, they are nevertheless frequently serious and sometimes fatal. Of these, the most serious is air embolism or a group of symptoms considered to be the result of air embolism, although the diagnosis may not be confirmed and is hard to explain in cases occurring where air has not been introduced into the thorax.

Another complication which sometimes develops while introducing the pneumothorax needle is spontaneous pneumothorax due to rupture of the lung. This can usually be rectified if given prompt attention, but, when occurring during the induction of pneumothorax, it may not be recognized as such at the time owing to the absence of a manometer reading with the needle in the pleural cavity and the feeling consequently that a free pleural space is not present. A reading may not be obtained if the needle is plugged or the rubber tubing does not fit snugly on the needle.

One should not be sure of being in the pleural space unless a free oscillation of the manometer fluid on the negative side is obtained. Slight oscillation of the manometer around the atmospheric level may occur with the needle just outside the parietal pleura. Not infrequently one hears of a patient having received large amounts

of air over a period of time without there later being any evidence of pneumothorax. No doubt, in some of these cases the air was introduced into the lung or bronchial passages owing to improper interpretation of the manometric readings. Again, one is reminded of certain incidents in the course of attempts at artificial pneumothorax, such as sudden coughing, blood-spitting and tasting of the local anesthetic by the patient, all of which, though possibly not of great import, nevertheless signify that the needle has passed through the visceral pleura into the lung or air passages.

Air entering the pulmonary arteries is blocked from entering the cerebral circulation by the lungs. Therefore, it would probably be necessary for air to enter a pulmonary vein in order to cause an accident such as air embolism, as air entering a pulmonary vein would pass directly to the left auricle and thence might proceed straight to the cerebral circulation. It would thus appear that the main danger lies in air entering a pulmonary vein. To do this, it is not necessary for the needle to penetrate deeply into the lung in that the tributaries of the pulmonary vein arise in the walls of the pulmonary alveoli. This accident is more apt to occur where large adhesions are present, as one is more likely then to penetrate the lung or tear adhesions with the needle.

Sudden severe pain occurring during the attempt to induce pneumothorax may indicate that a spontaneous pneumothorax has developed. The absence of a manometric reading is no criterion that a spontaneous pneumothorax has not developed.

If free oscillations of the manometer fluid on the negative side are obtained, accidents will be rare.

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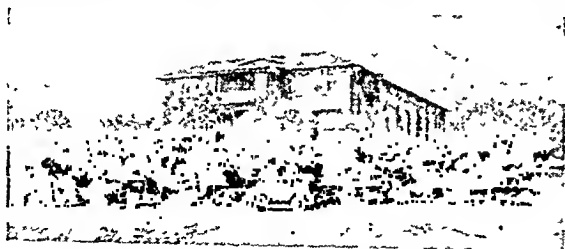
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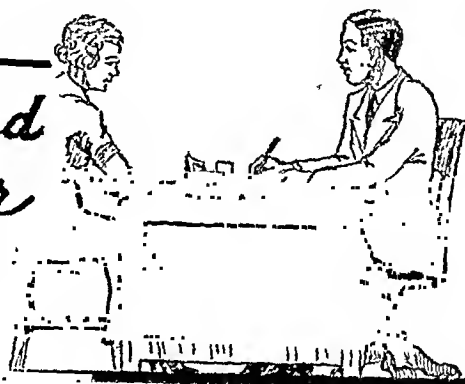
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**NOTICE:** Annual Meeting of the Federation of American Sanatoria at  
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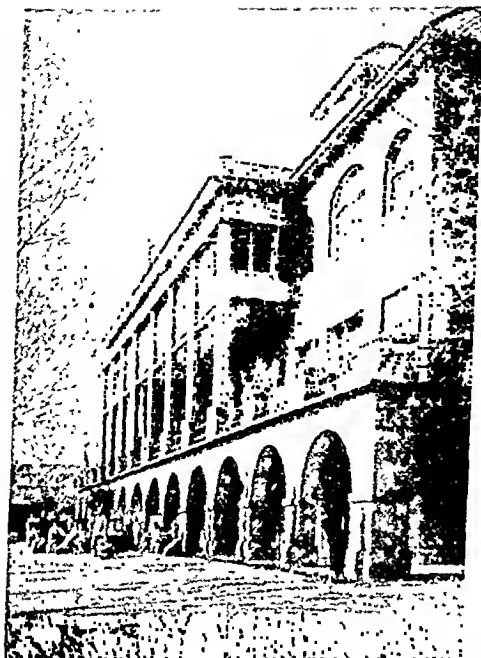
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*"This Open Letter is Addressed to Physicians and Officials connected with Industrial and Welfare Organizations."*

# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

MYRTLE AND VIRGINIA STREETS

EL PASO, TEXAS

April 1, 1937.

Gentlemen:

This is the *sixteenth* in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

It is the purpose of the Committee on Economics of the Federation of American Sanatoria to bring to the attention of physicians and to those officials who see large groups of patients, the facilities which the private sanatoria of this country have to offer to the tuberculous.

The first sanatoria in this country were established through private initiative and by private funds. We have come a long way since then, but our experience has taught us that individual private care can best be obtained in a private sanatorium.

The pioneers in the fight against tuberculosis have been the physicians in the private practice of chest diseases. They have kept in step with the modern trends of diagnosis and treatment. They are today, the members of the Federation of American Sanatoria and you will find them listed in our recent Pneumothorax Directory.

For your convenience, we have listed below the private sanatoria affiliated with the Federation of American Sanatoria. They are the finest private sanatoria in the United States and they are well equipped to cater to the welfare of your patients. Elsewhere, throughout this journal, you will find individual listings of these sanatoria.

For further particulars address any of the sanatoria or write to the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,  
Federation of American Sanatoria.

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*"The most important factor in diagnosis in  
the majority of cases of pulmonary tubercu-  
losis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

**Isolation** A GREEK physician at the time of Aristotle asked: "Why are those taken by phthisis, who are brought in contact with the sufferer, and not taken by such diseases as dropsy, fever and apoplexy, however close the contact with sufferers from this disease may be?"

Phthisis, continues this physician, is obviously infectious because it spoils the air and makes it dangerous, and thus others become infected. That such views as these were generally prevalent at that time may be gathered from a speech by Isocrates, who based the claim of his client to inherit his father's estate on the fact that he had nursed him whilst suffering from phthisis, although his friends had dissuaded him, saying that most of those who nurse this disease themselves succumb to it. Galen clearly held that phthisis was an infectious process, and that it was dangerous to live with those who suffered from it.

So we see that the infectious nature of tuberculosis has been known for more than 2000 years, yet today, only seven of our 48 states have adequate laws tending toward the control of the disease. In some of our largest states, from four to six thousand people die annually of tuberculosis. If this number of deaths were due, for instance, to small pox each year, we would be horrified. The general public would demand protection. This problem of tuberculosis control is one that can

be handled only when the proper legal machinery is set up—to the end that each tuberculous individual whose sputum contains tubercle bacilli, be isolated.

C. M. H.

**Pulmonary Abscess in Children** PULMONARY abscess is more frequent in

the child than the sporadic reports seem to indicate. Anatomic statistical data point to an appalling frequency.

The most frequent cause of pulmonary abscess in the child is pneumonia. The possibility for an abscess, gangrenous or otherwise, is always given in lobar pneumonia as well as in bronchial pneumonia, but a complexity of conditions seems to be necessary to bring it about.

In childhood, necrotic inflammations of the buccal cavity and upper air passages, as well as operative interventions on these parts, seems to play a special role. We find cases described after severe stomatitis, after rhinitis with profuse secretion, and especially after tonsillectomies.

Multiple hematogenic abscesses have been described following osteomyelitis, various skin suppurations, typhoid fever, etc. Pulmonary abscess is not uncommon following acute diseases of childhood, especially measles, whooping cough and scarlet fever. The inhalation of foreign bodies is also a frequent cause of pul-

monary abscess.

The diagnosis of pulmonary abscess in children is more difficult than in the adult, since typical symptoms, especially the characteristic sputum, are absent. An offensive breath may be an important clue. Physical findings are often negative, especially when the abscess is central. In most instances the x-ray must be resorted to to confirm the diagnosis.

C. M. H.

**Sources of Infection** THE TUBERCLE bacilli has often been said to be a strict parasite, not found outside of animal body, except in places contaminated by the morbid products of man and animals.

Man is the chief source of danger to man, and the sputum of the tuberculous individual plays the most important part in the dissemination of the bacilli. It has been estimated from a series of counts that a fairly well advanced tuberculosis patient expectorates from one and one-half to four and one-half billion bacilli in 24 hours. It is therefore evident that a single tuberculous patient who is careless in his habits may be the means of endangering many people. Rooms which have been occupied by tuberculous individuals may retain virulent bacilli for at least six weeks.

It must be remembered that the tubercle bacilli must have moisture in order to survive. It has been shown that a tuberculous individual in the act of sneezing will spray many small droplets of sputum containing innumerable bacilli, and that these droplets will remain suspended in the air in the moist state from one to two hours.

Another method of dissemination is through the habit of expectorating into handkerchiefs, which soil the pocket into which they are placed. Hands soiled with sputum also help the spread of infection.

Another source of infection is from the bovine type. However, since the Pasteurization of milk has become widespread, the danger from this source has been greatly minimized.

Since the main source of infection is from the open case of pulmonary tuberculosis, our only hope of control is through the control of this open case.

C. M. H.

**An Invitation** RECENTLY, there have come to our attention various criticisms of the subject matter, beliefs and theories as expressed in the articles published in this journal. We wish to state here that the sentiments expressed in the papers published in DISEASES OF THE CHEST in no way reflect the personal sentiments of the editorial staff or the editorial policy of the journal.

DISEASES OF THE CHEST has and will maintain the policy of printing any and all sides of any question pertaining to chest diseases and related subjects. We wish to extend here, in these columns, an invitation to any one who disagrees with the subject matter printed in DISEASES OF THE CHEST to send in a paper presenting the opposite side of the question. We shall be happy to publish it. L. B. K.

**Childhood Tuberculosis** THE STEADILY accumulating evidence that the adult type of tuberculosis can and does develop endogenously from the childhood type lends emphasis to the pediatric phase of the problem. The frequency of tuberculous infection in children, as shown by the percentage of positive reactors to tuberculin tests in various surveys in this country, has averaged roughly 15 per cent of all children up to fifteen years of age.

The lessons which may well be applied to routine practice may be stated as follows: First, a wider use of the tuberculin test in diagnosis is advisable. Certainly every child giving a history of a home contact with tuberculosis should be tested. Any child with an unexplained fever or with a subnormal weight gain deserves a tuberculin test. Indeed, a Mantoux test may well be made a routine procedure in hospital and private practice. Second,

every positive reactor's home, and surroundings should be investigated for the source of infection. The positive reactor should also have an x-ray of the chest, and the interpretation of this plate should be made by a physician adequately trained in the x-ray diagnosis of *tuberculosis*. And third, every case in whom a primary tuberculosis complex has been diagnosed, merits an adequate medical follow-up with proper hygienic and dietary supervision; and examinations at intervals frequent enough to assure the detention of any developing adult type of disseminating lesion early enough to establish effective special therapy. Fourth, the follow-up of any contact in the family whose sputum is positive with the view of isolating the open responsible case. C. M. H.

**Tuberculosis in the Negro** A FEW years ago it was said that when the negro develops tuberculosis, the victim rarely remained alive. The mortality is still much greater than among the whites. The medical profession of the South is almost unanimous in the opinion that in the Negro's condition of slavery, tuberculosis was not so common among them as now.

While tuberculosis exists as such a scourge among Negroes, it is plain that the white population is benefitted when the disease is checked in the Negro, for these people serve in the households of the whites.

Statistics in cities in both the North and the South cannot but carry their lessons. Since the tendency of the Negro is toward the congested district, the statistics concerning him are fuller and more reliable than for any of the other dark-skinned races except the Indian, who, like a Government Note, must be accounted for by the Government, but who, for manifest reasons is not so available for comparison as the Negro.

That tuberculosis among the negroes is receiving more and more attention annually can be shown by the increased number of beds for Negro tuberculosis

being established; the training of Negro physicians for tuberculosis work, and the establishment of health weeks for the Negro.

That there is much yet to be accomplished; one needs but to study the large death rate per hundred thousand still existing in the case of the negro. It still remains approximately three times that of the white race. C. M. H.

**The Third Annual Meeting** THE THIRD annual meeting of the Federation of American Sanatoria will be held in Atlantic City during the meeting of the American Medical Association. The Ritz-Carlton Hotel will be the headquarters for the Federation. Dr. Frank W. Burge of Philadelphia is chairman of the committee on Arrangements. A more complete description of the plans and arrangements will appear in the May issue. We would suggest, however, that you make your reservations at the Ritz-Carlton at Atlantic City as early as possible. Many have already made their reservations. C. M. H.

**Medical Meeting Season** THE SEASON most suited to the holding of medical conventions will soon be at hand. These meetings will consist of district, state, sectional and national gatherings, and the programs at each and all of them will be quite worth while. So widespread in their distribution are these meetings that it is not probable that there are many physicians in the United States who are not located conveniently to one or more of them.

The conscientious physician will take advantage of every opportunity to better fit himself for the duties of his profession, and to us it seems that there are few better ways to do this than the attendance upon medical meetings and giving careful attention to the programs which are usually so well presented.

Every man in the practice of medicine should keep these meetings in mind and attend one or more of them the coming spring and summer. R. B. H., SR.

# Rest Therapy in Pulmonary Tuberculosis

GALEN, who was born 130 years after Christ, employed rest therapy for the treatment of his tuberculous patients, and it remains the time-proved method of treatment upon which we still depend.

With the addition of pneumothorax and other surgical aids to make rest of the diseased area more effective, an era of increased interest in the treatment of pulmonary tuberculosis began. When the surgeon became actively allied with the internist in the care of these patients, a more aggressive treatment was instituted. Over enthusiasm resulted, however, in many operations that proved to be ill advised; not only were they not helpful, but some were distinctly harmful. A few years ago a large municipal hospital reported that phrenicectomies were being done on practically all patients entering the hospital.

At present there are those advocating pneumothorax for minimal cases with a view to permitting the patient to continue at work. There are to be found in our medical journals reports of the treatment of bilateral cavity tuberculosis by means of bilateral pneumothorax in ambulatory patients. Other writers vigorously condemn the use of surgical treatment until serial films show that progress cannot be expected by strict bed-rest.

With a disregard of the importance of segregation as a means of checking the spread of the disease, much has been written to encourage the family physician to carry on "home treatment", which usually must be done without the facilities considered necessary for good work by the internist who specializes in the care and treatment of the tuberculous.

These divergent opinions serve to confuse both the patient and his physician, and make advisable a review of our various therapeutic procedures, about the

BY  
J. W. HUSTON, M.D.  
Asheville, N. C.

indications and the limitations of which we are gradually learning more.

The axiom that "the repair of the diseased tissue is best furthered by complete rest of the diseased part", is just as true today as it was when surgeons first called our attention to its application in the treatment of pulmonary tuberculosis by their success in the treatment of bone and joint manifestations of the disease.

The question that now confronts us is: Have we arrived at a period in the treatment of pulmonary tuberculosis where by means of surgical procedures we can safely immobilize the affected lung, and obtain a satisfactory cure, while the patient remains mobile and carries on his usual activities?

Before conclusions are drawn we should review the results obtained by strict bed-rest, both with and without the surgical adjuncts which I regard as additions to rest therapy.

The physiological reasons for bed-rest and the serious effects that result in the patient who disregards the need for rest should also be considered.

If, by resorting directly to surgery, the results are as good as those obtained through rest and its surgical adjuncts, then by all means we should resort to surgery and relieve this vast army of sufferers of much expense and loss of time. But, if surgery and ambulatory or partially ambulatory treatment fails to meet the requirements for the majority of patients, then great care should be exercised in the type of treatment selected for the individual case.

The tuberculous patient is ill only in proportion to the amount of tuberculo-toxins that finds its way into the blood stream. If a tuberculous patient is given tuberculin subcutaneously, in sufficient amounts, both systemic and focal symp-

toms will result. Headache, fever, general aching over the body, nausea and vomiting are complained of, and an examination of the chest will show congestion, rales, and other signs of increased activity in the affected area.

The tuberculous patient can duplicate these signs and symptoms any time that he indulges in a sufficient amount of exercise. Just as there are different degrees of reaction to various-sized doses of tuberculin; so there are moderate or severe symptoms that follow different amounts of physical exercise.

Some years ago only the toxic fever case was considered a subject for bed rest. Following the loss of fever the patient was allowed up and more or less mobile. Now, however, we have learned that progress continues most rapidly if rest is uninterrupted; that mobility of the patient interferes with repair work and all too frequently leads to advancement of the disease.

We have learned that all clinical cases, however mild, should be placed at strict bed-rest because the same mechanism is required for the healing of the minimal as is required for the more advanced case. Occasionally we see recoveries with a less strict regime, and we know that some patients recover without any treatment just as some do in other infections, but no patient can afford to experiment for the purpose of learning whether or not he is in that class.

Pottenger, in a paper on *The Physiological Basis of Rest as a Therapeutic Measure in Pulmonary Tuberculosis*<sup>1</sup> says:

"Twenty per cent more effort is required to sit quietly in a chair than to lie in bed; one hundred per cent more is required to walk about and three to four hundred per cent more for strenuous exercise.

"Two hundred fifty to three hundred c.c. of air is required per minute while at rest, and for moderate exercise six hundred to sixteen hundred c.c.

"The healthy pulse rate, while resting,

is from seventy to eighty; under moderate exercise from one hundred to one hundred twenty, and for strenuous exercise a rate of one hundred fifty to two hundred is necessary.

"The heart output is four or five liters per minute while the body is at rest and twenty liters when at work. The blood pressure must rise fifty to sixty mm to maintain sufficient oxygen for exercise.

"Under normal conditions the increased output of the heart is accomplished by greater ventricular activity with a relative increase in rate while in the tuberculous patient response is mainly by increased heart rate and is deficient in ventricular response."

Even when the patient lies quietly in bed the respiratory rate is more than 1000 per hour, and when he stands on his feet the respiratory and circulatory load is markedly increased; there is more movement of the diseased area; lymph flow is stimulated, and a greater volume of pulmonary blood carries into the general circulation increasing amounts of tuberculotoxins. On the other hand, slowing of the pulmonary circulation and increasing stasis of the lymph lessen the amount of toxins carried in the blood stream and favor healing.

Serial films show that absorption of exudates and debris takes place when the affected area is sufficiently immobile. Absorption is hindered, or prevented, if the patient is tuberculinized by the frequent flooding of the circulation by toxins. Cough and sputum are reduced as immobilization becomes effective, but aggravated by increase of respiratory and circulatory effort.

Strict bed-rest gives splendid results for the early involvement, and no other form of treatment should be considered for the exudative type unless the allergic response has been so severe that necrosis of tissue and cavitation has taken place.

With bed-rest alone many moderately advanced cases do well and small cavities may disappear, but, if the cavity is more than two centimeters in diameter, or has

thickened walls, bed-rest will prove insufficient.

If the lung is not adherent to the chest wall a collapse by pneumothorax closes cavities, immobilizes the diseased area, and favors healing by fibrosis.

Rarely do we find a case that is free from adhesions, but, by maintaining an even pressure through frequent refills of 250 to 350 c.c. of air, we may gradually produce an effective collapse.

Pleural effusion is not so frequent a complication where small refills are repeated at intervals that keep the pressure as uniform as possible. If an effusion occurs, the fluid should be removed and replaced by air. Often we again get a dry pleural cavity, but, if the fluid is allowed to remain, we frequently lose the pneumothorax.

Adhesions that prevent collapse may be severed by pneumolysis, if they be accessible, or we may consider reducing the tension of an adhesion by phrenicectomy.

Certain thick-walled cavities in the first interspace area are recognized by the experienced observer as being unsuitable for closure by pneumothorax. He recognizes the fact that such areas tightly adhere to the pleural dome, and, although the remainder of the lung may be nicely collapsed by gas, the cavity will remain open. He may choose to do a partial thorocoplasty with or without the collapse of the remainder of the lung by pneumothorax, depending on the amount of pathology present. With an extensive involvement through a greater portion of the lung the complete thorocoplasty would be indicated.

In 1916, Webb<sup>2</sup> first pointed out the advantages of postural rest, and the use of shot-bags. For a cavity in the upper part of the chest a shot-bag of about three pounds may be placed over the affected area so that movement of that part will be reduced to the minimum. Air in that portion of the lung is reduced, atelectasis of some degree takes place, and a collapse of the cavity tends to follow. For involvements lower in the lung

the patient is placed on a firm pillow on the affected side, a similar effect occurring when the weight of the body restricts movement of the affected area. Placing the patient on the affected side has been of value to me in some cases and the use of the shot-bag in the upper lobe has closed cavities for me, but the treatment must be continued over a long period of time if the cavity is to remain closed.

The use of either posture or shot-bags is justified when a pneumothorax is impossible and the patient's general condition forbids the use of thorocoplasty as too hazardous, but pneumothorax and thorocoplasty are the operations upon which we must place our reliance for effective results.

Phrenicectomy, formerly tried for numerous types of lesions, has been disappointing. Corrylos<sup>3</sup> reports that in selected basal lesions phrenicectomy is successful in but 16 per cent of the cases, and that he is convinced that the reported successes of enthusiastic supporters of the operation are due to their use of it in benign, acute, exudative tuberculous, and that the patients recovered, not because of, but in spite of phrenicectomies.

Good serial stereoscopic films are of the utmost importance, not only for diagnosis, but for following the progress of the case, and to determine the need for surgical intervention.

In a large percentage of cases suitable for pneumothorax, an active lesion is found in the opposite lung. In such a case we have no choice but to maintain strict bed-rest and at the same time carry on the pneumothorax.

Only infrequently do we get a perfect collapse by pneumothorax, but, if the cavity is closed, and the sputum remains continuously negative, it is effective. A positive sputum means an unsatisfactory pneumothorax.

The location of the cavity and the size of the bronchus into which it drains determines the effectiveness with which we may collapse the cavity.

(Continued to page 26)

# The Treatment of Bronchial Asthma By Intratracheal Injections of Iodized Oil \*

BY

WILLIAM ANDERSON, M.D.\*\*  
Pittsburgh, Pennsylvania

IN 1932,<sup>1</sup> the author reported sixty cases of bronchial asthma treated by intratracheal injections of iodized oil in which the results were very satisfactory. Since that report was published two hundred additional cases have been completed or a total of 260. The group is now sufficiently large and has been under observation long enough to determine the value of this method of treatment.

The patients were nearly all of the chronic type who had tried the usual methods with little or no relief. With the exception of very young children, they were unselected as to age, duration of condition, or etiological factors. With few exceptions, the history of every patient showed the inherited asthmatic background. The oil was the only medication except adrenalin for the immediate relief of an attack.

A study of roentgenograms of the chests of patients with bronchial asthma taken after injections of iodized oil showed a partial or complete obstruction in the medium and smaller bronchi in a large majority of them. Singer,<sup>2</sup> in 1926, pointed out imperfect fillings of the tubes during an attack and Steinberg<sup>3</sup> made the same observation in 1932. In the cases under discussion obstructions were observed also during the interval between attacks. They were not influenced by injections of adrenalin, but in nearly all cases disappeared after repeated injections. The conclusion that the obstructions in the lumen of the bronchial tubes were due to pathologic secretion seems justifiable. Steinberg<sup>3</sup> reached the same conclusion after correlating roentgeno-

logic observations with the autopsy findings in patients who died from allergic asthma. Pneumoconiosis, healed tuberculosis, atelectasis, and certain types of bronchitis also cause obstruction of the bronchial tubes, but are easily differentiated from pathologic secretion.

When the patency of the tubes was established there was prompt relief in many cases which indicates a relation between the occluded bronchi and the asthmatic paroxysm. Steinberg<sup>3</sup> is of the opinion that "an asthmatic paroxysm is essentially due to bronchial occlusion by mucus as a result of a hypersecretory activity of the bronchial mucous glands and the degree of the attacks is proportionate to the extent of mucous secretions and bronchial plugging." The plugging of the bronchial tubes interferes with free drainage and normal ventilation of the lungs. Toxic products, probably bacterial, are retained which act as an irritant and may contribute to the production of the asthmatic paroxysm.

The major objective of this treatment, therefore, is to remove the pathologic secretion by frequent injections of iodized oil until the patency of the tubes is restored.

Preliminary to the treatment, a thorough physical examination, a roentgenogram of the chest, and in some cases a bronchoscopic examination should be made of each patient to eliminate those conditions which give rise to asthmatic symptoms but are not true bronchial asthma such as growths within or without the bronchi, enlarged tracheobronchial glands, enlarged substernal thyroids, and foreign bodies.

This treatment is contraindicated in cases complicated by acute tuberculosis, cardiorenal conditions, hyperthyroidism, aneurism, angina pectoris, and in debilitated persons.

\*Read at the Post Graduate Polyclinic Hospital, New York City, February 8, 1936. Reprinted from the "New York State Journal of Medicine," August 15, 1936.

\*\*Chief of Bronchogenic and Asthmatic Department, Western Pennsylvania Hospital.

Practically no preparation of the patient is required preliminary to the treatment. In very nervous patients, a sedative may be necessary preceding the first injection. One-eighth to one-quarter grain of morphine sulphate given hypodermically one-half hour before the injection will prove satisfactory. Subsequent use of a sedative is rarely necessary.

Lipiodol, iodized oil, is admirably suited for the injections. It is a solution of forty percent, by weight, of iodine in poppy-seed oil. The iodine is fixed in the fatty molecule. This makes it relatively non-toxic and non-irritating, and may be retained in the lungs over long periods of time causing little, if any, inflammatory reaction. The fatty molecule is fragmented before the iodine is liber-

ated. This takes place in the presence of air and heat, and the fat-splitting ferments in the tissues.<sup>4</sup> Its absorption takes place from the bronchial mucosa and alveoli of the lungs and may be found in the urine six hours after it is injected into the tracheobronchial tree. After the iodine is absorbed or liberated, it stimulates the bronchial secretory glands causing them to excrete large amounts of normal secretion which increases the fluid contents of the tubes. It dissolves the mucin in the secretion, renders it less viscid and more fluid, thus making possible its elimination by the bronchial drainage mechanism. It stimulates the bronchial mucosa, decreases congestion, absorbs exudates, and restores the normal circulation. The rapid decrease of the bacterial flora from the sputum indicates its bactericidal action.

It also is of value in forming a protective film over the surface of the mucosa, which prevents irritation by dust drying and the entrance of bacteria. Its high iodine content gives it a specific gravity much greater than the bronchial secretion. Immediately after injection, it gravitates to the most dependent portion of the tubes, dislodges and displaces the secretion upward into the large tubes, where it is eliminated by the cough reflex.

In order to successfully inject the oil into the bronchial tree, the swallowing and cough reflex at the bifurcation of the trachea must be completely abolished, otherwise the patient will swallow or cough up the oil. This is accomplished by spraying the pharynx and anterior and posterior pillars with a solution of two percent of nupercaine and injecting into the larynx two to three c.c. of a five percent solution. In most patients this produces complete anesthesia in five minutes. This solution has proved very satisfactory. It produces anesthesia quickly, and no toxic symptoms have been observed in more than five thousand injections. The oil should always be warmed to 110° before being used because if injected when cold, it may excite a cough

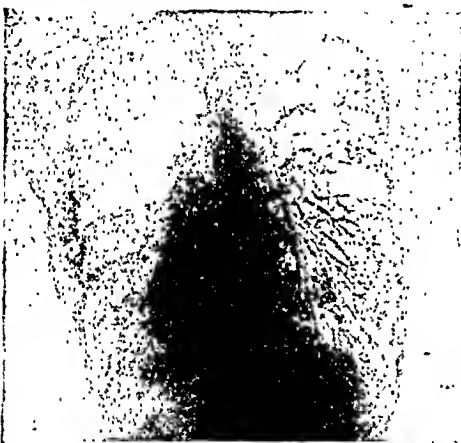


Fig. 1. Normal lung showing oil in the bronchial tube seven minutes after injection.



Fig. 2. Magnified view of roentgenogram showing complete obstruction of bronchi. Between interval of attacks, thirty minutes after injection of ten m. of adrenalin.

reflex. The heat decreases its viscosity and enables it to flow more rapidly into the finer bronchioles. As a rule, it should be injected during the interval between attacks, but if given during an attack, an injection of adrenalin should first be given to relieve the spasm of the bronchial muscle and to reduce the edema of the mucosa. This enlarges the lumen of the tubes permitting the oil to flow into the finer bronchioles.

There are a number of methods of injecting the oil into the tracheobronchial tree and each has its merits. The transglottic method has been found most satisfactory because it enables the operator to place the oil in any part of the lung. It does not traumatize the tissues. It requires no expensive instruments or trained assistants. A twenty c.c. metal syringe having a cannula six to eight inches long is the only instrument required.

If both lower lobes are to be injected, the patient is seated before the operator and instructed to grasp his tongue with a piece of gauze, and draw it forward as far as possible. This raises the larynx, and closes the upper end of the esophagus. The syringe containing the oil is held in the right hand of the operator. His left index finger is passed down to the epiglottis and the epiglottis brought forward. The tip of the cannula is guided along the finger to the glottis. The finger is withdrawn, and the oil is slowly injected while the patient breathes normally. When either of the lower lobes is to be injected the patient inclines his body to the right or left; when it is the upper lobe, the patient should lie upon a table and turn upon the side to be injected with his arm hanging over the edge, his head flexed forward and supported by an assistant. The oil is injected and the head of the table is dropped twenty degrees. He should remain in this position for at least five minutes. This allows the oil to gravitate into the upper lobes.

The first injection into any portion of the bronchial tree, should be given to

determine the presence of obstruction in the tubes. The lower lobes should be selected first since they are the reservoirs into which the upper respiratory tract drains and it is in these lobes that stasis most frequently occurs.

A fluoroscopic or Roentgen ray examination of the lobe injected should be made immediately following the injection. If there is nothing to interfere with the flow of oil, it will reach the air vesicles in from seven to fifteen minutes and only a film of it will remain in the tubes so thin it is difficult to visualize. If it does not reach the vesicles within this time, complete or partial obstruction should be suspected. The obstruction may be due to a broncho-spasm, edema of the mucosa, or to secretion (Fig. 1).

In order to determine to which of these it is due, ten minims of adrenalin should be injected and in thirty minutes a fluoroscopic examination made. If a broncho-spasm has retarded its flow, the adrenalin will have relaxed the spasm, or reduced the edema, and the oil will have flowed into the vesicles. If there is no change in its position, an occlusion is present, probably due to secretion. No obstructions can be seen in some cases because of superimposed shadows cast by parallel branches. If the oil does not reach the periphery of the lung or if there are areas which do not fill, it is evident that the finer bronchioles, which are not visible, are obstructed (Fig. 2, 3).

A study of the walls should be made to determine the presence of bronchiectasis. The dilatation which occurs in bronchial asthma is usually not extensive. The normal tapering of the tubes is lost. They become straight, spindle-shaped, or cylindrical. Occasionally some varicosity can be observed. Large dilatations with bronchiectatic areas in which there was morning sputum and other evidence of stasis was found in less than three per cent of the cases. Emphysema which is present in nearly all cases of chronic asthma has the appearance of bronchiectatic areas when injected with iodized oil.

After the expiration of one week, the opposite lower lobe should be injected and the same procedure followed. The interval between the injections affords ample time to note any reaction which may take place.

If there is complete or partial stenosis of the tubes, enough oil should be injected into the obstructed areas to maintain contact with the secretion. Ten to twenty c.c. is usually sufficient for one lobe. If both lower lobes are to be injected at the same time, which may be done after the initial injection, from twenty to thirty c.c. may be required. The amount to be injected at subsequent injections depends upon the rapidity with which the secretions are liquefied and dislodged, and the number of tubes obstructed. If the secretions are soft the oil will liquefy and displace them quickly, but if they are hard or partially calcified and adhere tenaciously to the bronchial mucosa, or many tubes are involved, a much longer time will be required to restore their patency.

The rate at which the oil disappears from the lung must be considered. If it does not pass into the vesicles soon after injection much of it will be expelled by the cough reflex within twenty-four hours. When this occurs, the injections may be given more frequently with safety. When it reaches the vesicles it is not affected by the cough reflex but remains until absorbed. The rate of absorption depends upon the activity of the fat-splitting ferments in the alveoli.<sup>4</sup> This activity varies with the individual and at times in the same individual. Only sufficient oil should be injected to replace that which has disappeared. If more is injected the lung may become overloaded. At no time should the amount of oil in the lungs be sufficient to reduce the vital capacity more than fifty per cent. Should this be exceeded, the attacks of asthma may increase in frequency and severity and extreme cyanosis may follow. A fluoroscopic examination should be made frequently

during the course of treatment to determine the amount.

When the oil reaches the vesicles indicating that the tubes are free of secretion, the amount should gradually be reduced and the time between injections lengthened as the attacks of asthma become less frequent and less severe. If there is no improvement after several injections into the lower lobes and there is reasonable assurance that the oil has reached the vesicles, then the same procedure should be carried out with the middle and upper lobes except that only one lobe should be treated at a time. Treatment should not be discontinued for lack of relief until every portion of the bronchial tree has been washed out with the oil and the tubes are unobstructed unless some contraindication should arise (Fig. 4).

The response to the treatment varies. Some patients obtain relief from attacks at once; in others there is gradual improvement; some do not show any improvement for many months and then relief may come suddenly or gradually. Generally speaking, young persons respond more quickly than those more advanced in years. Patients in whom asthma followed some infection of the respiratory tract such as bronchitis, measles, whooping-cough, influenza, or pneumonia, usually respond more slowly than those in whom the attacks are precipitated by foods, odors, dust, pollens, danders, etc.

The following abbreviated case histories are illustrative:

CASE 1. J. H., male, age fifteen, had frequent attacks of asthma and hay fever since three years old. Skin tests were positive to seventeen pollens. Ten injections of iodized oil were given into the right and left lower lobes during one year. The attacks of asthma and hay fever ceased after the third injection and he has had no recurrence in three years.

CASE 2. C. S., male, age twenty-six, totally incapacitated by bronchial asthma for eleven years. Asthma followed influenza. He received thirty injections of

the oil into the middle and lower right lobes during fourteen months. There was no improvement in six months, then the attacks abruptly ceased. He did not have asthma for seven years. Recently he had a tonsillectomy which was followed by an attack of asthma. He is being treated again and is responding satisfactorily.

CASE 3. T. S., male, age six, had pneumonia when three years old followed by asthma which became progressively worse. The oil was injected every three weeks in the right middle lobe for one year. He gradually improved for six months when attacks of asthma ceased. He has not had a recurrence in five years.

CASE 4. Miss B. A., age twenty, semi-invalid because of bronchial asthma for thirteen years which followed bronchitis. She received thirty injections of the oil in eighteen months. The asthma improved fifty percent the first six months and the improvement stopped. The oil had all been injected into the lower lobes. During the next six months the right and left upper lobes were injected. In six months the attacks ceased. She was free from attacks for eight years.

CASE 5. Miss E. G., age sixty-three, ill two-thirds of the time with bronchial asthma for forty-eight years. For two and one-half years she was given injections of the oil into the lower lobes. Gradual improvement followed. In the first year and a half she improved ninety percent. The last year of treatment she had two slight attacks, but has been free from them for more than a year.

In ninety per cent of the cases there was a rapid subsidence of the bronchitis so often a part of the asthmatic condition. In many cases it ceased after only a few treatments.

Another result was the decrease of clinical sensitiveness to excitants and stimuli which had previously precipitated attacks. This occurred regardless of the nature of the excitant, protein or nonprotein, endocrine, peripheral, or the various injections of the respiratory tract. Many patients lost their clinical sensitiveness

in a very short time although skin tests were still positive.

Asthmatic patients are usually susceptible to colds. A decrease in this susceptibility was observed after treatment in seventy-five per cent of the cases.

The following cases are examples:

CASE 1. C. A., male, age thirty-three, was sensitive to horse dander, onions, and cabbage. He had suffered from asthma accompanied by an intractable cough for twenty-four years, and was rarely free from a cold. After the eighth injection of the oil he became clinically desensitized to horse dander, and after the tenth injection to onions and cabbage. He has had very few colds and the cough and asthma have been entirely relieved for three and one-half years.

CASE 2. Mrs. E. S., age twenty-five, had asthma, frequent colds, and bronchitis for twelve years. She was sensitive to aspirin. After the seventh injection she was clinically desensitized. The bronchitis gradually improved and finally disappeared. For four years she had taken aspirin frequently for headache. She has had no asthma and rarely a cold.

CASE 3. Mrs. G. S., age thirty-six, had asthma during her menstrual period. The oil was injected into the lower lobes for one year. After the third injection the attack was less severe, and after the sixth injection she menstruated without an attack. She has not had asthma for five years.

CASE 4. Mrs. R. S., age fifty-two, for ten years complained of wheezing and dyspnea after which definite and frequent attacks of asthma developed. She immediately had an attack whenever she ate tomatoes or fish. She was given eleven injections of oil for eleven months after which she was clinically desensitized to the former irritants.

CASE 5. M. O'R., male, age ten, was sensitive to water for five years. Contact with water while bathing feet or body brought on an attack of asthma. He had chronic bronchitis and contracted a cold on exposure to cold air. Both lower lobes

were injected on an average of every two weeks for eight months. He was rapidly desensitized to water and has been able to bathe and swim without recurrence of asthma for three years.

In some of the patients there was a reaction following an injection, but in the majority of them the presence of the oil in the lung was well-tolerated.

When the oil contacts the trachea in some patients it produces a convulsive cough lasting from an half-hour to two hours, and the patient may become very exhausted. In others a severe attack of asthma may be brought on by an injection

of as little as two c.c. of the oil. This reaction is probably caused by its contacting irritable endings of the vagi in the bronchial mucosa. If it is injected too rapidly dyspnea follows and may produce an acute collapse of the lung.

In some patients, asthma is complicated by chronic laryngitis, tracheitis, or bronchitis accompanied by an extreme sensitiveness which excites a cough reflex as soon as the oil touches the mucosa and the oil is immediately expelled. The treatment of such cases by this method is unsatisfactory and the use of a bronchoscope is an advantage.

There may be a chill, rise of temperature, increase of pulse, and pain in the area injected in some patients. If the treatments are not repeated until these symptoms subside and most of the oil disappears from the lungs, this reaction does not occur again.

There were only eight patients in the group treated in which severe iodism occurred. These patients were susceptible to iodine and the treatment was discontinued. There were no cases of chronic iodism although a large quantity of oil was kept in the lungs for a long time. Iodism can be avoided by a careful testing of the patient's tolerance and by not injecting the oil into the stomach. If the latter should occur, it should be removed at once with a stomach tube or by giving a brisk cathartic.

The oil has been kept constantly in the lungs in some patients for three years and a Roentgen ray examination made two years after treatment was discontinued disclosed no injury to the lung tissue.

Autopsy study was made in one patient who died of an abdominal condition. She had received injections for eight months. A study of the lungs revealed no pathologic change that could be attributed to the oil.

Eight cases of pneumonia occurred in the entire group while under treatment. Five of the cases were bronchopneumonia; four patients recovered and one

(Continued to page 30)



Fig. 3. Roentgenogram one hour after injection of oil and thirty minutes after an injection of ten m. of adrenalin. Oil has nearly all passed into the vesicles. Obstruction in lumen of tubes has disappeared.

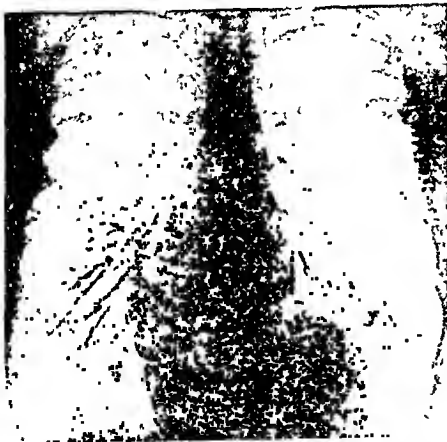


Fig. 4. Same as Fig. 3, one month later, following a reinjection of oil. Obstruction in lumen of tubes has disappeared and oil has entered the vesicles.

# The Home Treatment and Management of Tuberculosis

THE DIAGNOSIS of tuberculosis is made—and in a few short words the whole life program of one or more individuals is interrupted. The change concerns both the patient and his immediate family. After the shock is over, problems begin to present themselves. For some these problems and decisions are simple; for others they are difficult, if not indeed almost insurmountable.

"Must I change climate; must I go to a high altitude or to the desert; how long will it take to get well; can I do part time work; should I go to a sanatorium?" These are only a few of the questions arising that must be answered by the doctor.

The physician will sit down with the patient and his mate, his parent, or whoever controls the family budget, and learn the available resources. Climate and altitude are dismissed as being of secondary importance, if important at all. The patient is then told the probable length of time it will require to get back to a working stage again. It is a great mistake to lead a person to believe it will require only two or three months because at the end of that time he again must readapt his mental attitude to continuing in bed for another period and temporarily his hopes and plans for the immediate future are recrushed. It is far better to let him know it may take one, two, or three years before he will work again and he can plan accordingly. Often a patient will respond more rapidly than anticipated and not require the estimated length of treatment. Unfortunately, the reverse is often true. Part time work, as a general rule, is prohibited except during the recovery phase.

If the patient is able to afford sanatorium care, he is directed to a suitable one. It must be borne in mind that there are as many and varied types of sana-

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toria as there are types of homes. There are some which do not deserve the name of sanatorium, where in reality the patient treats the doctor and not the doctor the patient. Here he is allowed to do much as he pleases until his disease gets ahead of him.

If his family is of limited means, a sanatorium is not recommended, for very obvious reasons. If he is eligible for a charitable institution and the doctor is assured of the type of care he will receive, then the patient is urged to take advantage of this opportunity.

Sanatorium care is available only to about one out of eight, there being some 800,000 tuberculosis cases and only 85,000 beds available in the country for the tuberculous. The other 700,000 must be cared for and controlled, not only for their own good but for that of the community as well. There remains only the home in which to do this.

The patient's next question is: "Can I get well at home?" The answer is yes.

In treating tuberculosis it is absolutely essential that the doctor have complete control over the case. This calls for confidence and cooperation from the patient and his family. The best results are obtained if this control extends through his illness, the transition period in which he works back into a normal life, and the follow-up in the years to come. In a large city or where the weather is extremely unseasonable at times of the year, it may be very difficult or impossible to treat successfully more than a few home cases. In the semi-urban and rural communities a doctor in his rounds may drive thirty miles and see several patients while in a city perhaps only five miles can be covered and one home visit made in the same length of time. In Orange County, with a population of 125,000, the problem of home management is not difficult. In

this community it is my practice to see cases at least twice a week. One hundred to one hundred and fifty miles will be covered in making rounds. This can be done in four to eight hours, depending on the number of patients seen and the number of re-fills given that particular day.

A charge is made by the month which includes all the necessary procedures. The fee is on a sliding scale to meet the individual financial situation. There are no extras. X-rays are taken as indicated; in some cases this is not oftener than every two or three months. On the other hand, if the patient should require an x-ray daily for several days these are taken without extra charge. It is found that "extras" upset the morale, cause worry, and interrupt home treatment. On a monthly basis, the individual knows ahead of time the financial obligation he is expected to meet.

In the treatment of home cases a suitable room with two or more windows is chosen. Diet is well-balanced but no special diet is prescribed unless indicated. The patient is not stuffed but is encouraged to eat a little more than his average diet because of the increased metabolism caused by the disease. He is placed on a definite routine which varies somewhat with the household and the type of lesion. Frequent visits are necessary as few people can successfully take the "cure" without adequate guidance; the pitfalls are too many. The sensation of well-being which comes after a period of rest and before pathological improvement occurs leads one to believe he is well. If not correctly advised he will want to return to his business, believing himself completely out of danger.

In general absolute bed rest is insisted upon. To tell the patient to go home and rest is not enough. To the uninitiated this might be interpreted as going to the bathroom ad lib, sitting at the table for meals, or even going for automobile rides. Bed rest calls for a bed pan, and incidentally the bed pan is of more value than the

clinical thermometer. The temperature chart is simply a matter of record; the bed pan conserves considerable energy. Bed baths are to be given until tub baths are earned by the patient as he improves. Certain cases are, of course, permitted bathroom privileges once a day from the beginning. Hygiene is observed as in any sanatorium. Suitable paper napkins are used for coughing, sneezing and sputum. These are burned daily. Dishes are kept entirely separate and boiled after each meal. Children are kept strictly out of the room. Following these precautions the danger to children and others should be slight. If the members of the household are already tuberculo-allergic, they are x-rayed. If children have survived without more than a positive skin test for a few months to four years or more, which is often the length of disease before diagnosis is made in a tuberculous parent, it is not reasonable to suppose that the child will be in danger when the parent is isolated in the home. Contact children are re-checked every six months or oftener, if indicated. Visiting hours are observed as in a sanatorium. Absolute rest for two hours in the morning, during which there is no visiting, reading, or listening to the radio, is observed and the same length of time following the noon meal. Lights and radio are off at eight in the evening.

Visitors of certain temperament who make the patient nervous are excluded. The patient is not to be bothered with business or household worries. He is instructed against following the advice of well-meaning but ill-informed neighbors who are sure that the only way to cure his illness is by sun bathing, by working it out of his system, by the carrot juice diet, or by the wonders of lotus root. Physical and mental relaxation are taught. A healthy mental attitude is extremely important. The patient is encouraged to ask questions. He is educated in tuberculosis and shown his x-rays. He is always told the truth, except in terminal cases. The tuberculous patient is very apt to notice any discrepancies of

statement, even if made months before. If he takes his disease too frivolously, its importance is stressed. Unimportant and neurotic symptoms are ignored; other symptoms, such as referred pains, are explained. In short, the more the intelligent patient understands about his condition the better he combats the disease. However, there are exceptions to this rule and the doctor must be on the lookout for one who will be adversely influenced by too much knowledge.

Medication by mouth is kept to a minimum because of a too frequent delicate gastro-intestinal system and also because of the length of the disease. Cough can be controlled a good deal by will power. Hypodermic medication is often indicated and of value. Sputum examination and sedimentation rate are usually done once a month; blood counts every two or three months.

To set a good example the doctor should put into practice what he preaches. He emphasizes bed rest for this reason x-rays are taken at the bedside. It is obvious that driving to the office, even from a mile or two away, uses considerable energy. With two film holders, a man to help load and set up the machine, a number of x-rays can be taken in one morning each month. Films are changed in any dark closet in the patient's home from cassette to a light proof box and developed later at the office. When the patient is on graduated exercise he is allowed to come to the office for the necessary procedures.

Modern splinting of the lung can be accomplished at home. Empyema cavities can be aspirated and washed out, oxype-ritoneum and pneumoperitoneum can be given at home, the former for tuberculous peritonitis, enteritis, or fistula of the rectum, the latter for splinting diaphragms in far advanced bilateral cases. Pneumothorax can be started and continued at home. However, it must be conceded that it is better to give the initial and first re-fill in a hospital. There is often a partial spontaneous collapse after

the first injection of air. This is true whether it is recognized or not and at times can be extremely alarming, calling for repeated removal of air. It is for this reason that it is more convenient, but not absolutely essential, to hospitalize for a few days. Severe hemorrhage should call for hospitalization as nothing is more terrifying to the patient or his family. With the patient out of the house it at least saves the household the discomforts of this unfortunate experience. Phrenic nerve operation or thoracoplasty are hospital procedures.

When it is time for graduated exercise the patient is allowed first to sit up in bed, later in a chair, gradually increasing this privilege. This is followed by five-minute daily walks and as indicated both the walks and the time up are gradually increased. When he is up eight hours a day and walking one-half hour twice daily, home visits are discontinued and he reports to the office once a month. By this time he should have learned what it is all about. He should know that he is now starting on a trying period; the transition period from convalescence to a normal life. It is during this time that the patient must build up confidence in himself, learn to stay within his fatigue limit, and work back both to physical and economic stability.

In California the State Vocational Bureau will give three to six months training to anyone recovering from tuberculosis. The training is along practical lines. Every effort is made by those guiding this project to direct the case along the channels that will be of the greatest help. The patient may elect to go to business college, take up photography, learn radio-repairing or watch-repairing, motor-winding, dress-designing, laboratory work, or any vocation of like nature. This opportunity is not limited to institutional cases or even to tuberculous cases, but is open to any handicapped individual. The idea is to secure for him economic freedom, but it also had a second func-

(Continued to page 24)

# The Significance of Pleurisy with Effusion

RECENTLY there has been much said about the early diagnosis of tuberculosis but there yet remains much more

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to be said and done about it. If the medical profession ever banishes tuberculosis from the list of human ailments, it will have to educate itself and the lay public along the lines of earlier recognition as well as early and continued treatment. There are a number of symptoms that we associate with early or beginning tuberculosis, but as a rule pleurisy with effusion is not in this commonly accepted group; at any rate, its significance is too often overlooked. There are entirely too many patients who turn up with far-advanced pulmonary tuberculosis who have had a pleurisy with effusion in the last year or several years and were not suspected in the least of having any tuberculosis at that time. The patient may have been aspirated a time or so, told to go to bed for a few weeks until the fever disappeared, and then allowed to return to work without the true etiology of his effusion having been determined. Pleurisy with effusion is not a disease entity of its own but is always a symptom of some disease or injury affecting the pleura of one or both lungs. It is not always an early symptom of tuberculosis but when it comes out of a clear sky, not associated with any acute respiratory infection, attacking an apparently well patient, it should be considered as a symptom of tuberculosis until correctly or definitely diagnosed otherwise.

## Incidence

The incidence of effusions in tuberculosis is not particularly high, but a survey of the patients of any sanatorium will reveal that more than an incidental number have had pleurisy with fluid formation and that many of these will date the onset of their tuberculosis from the

time of their effusion. Frequently, a patient with advanced involvement will tell the attending physician that he has had tuberculosis only a few months, but has not been in good health since he had fluid drawn off his lungs several years before. Repeated instances of such statements have convinced the writer of the significance of pleurisy with effusion which is too often passed off as an acute infectious entity. This short paper is a plea to the profession to go farther into their effusion cases, associating them more in the future with tuberculosis.

## Symptomatology

The symptomatology varies but in the average case the onset of pain in one side increasing in severity comes on suddenly without a prodromal period. There may be a hacking, non-productive cough. The temperature will soon climb up to 102, 103, or 104 degrees and may remain so with daily variations. Profuse sweating, both in the day time and at night, will accompany the variations in the temperature curve. The respiratory rate will increase as the effusion increases; if this becomes large enough to fill one hemithorax and encroaches on the opposite lung by pushing the mediastinal contents over, the respiratory embarrassment may increase to a severe dyspnoea. The pulse rate will come up as the temperature rises and may become alarmingly rapid with marked displacement and embarrassment of the heart. The symptoms may abate within a few days or they may continue in all their severity for many weeks. There are very few conditions that give us a more acutely ill-appearing patient in such a short length of time than does a severe pleurisy with effusion.

### *Physical Findings*

Any attending physician can elicit enough findings to diagnose a moderate-size effusion if he will take time to give the patient a fairly complete examination, keeping in mind the symptoms present. Inspection will show a patient acutely ill nearly always lying on the affected side and having a rapid respiratory rate. If the patient is sitting up or lying on the back, limited expansion on the affected side will be noticed. Fremitus will be decreased over the effusion and percussion varies from a slightly impaired note to flatness over the fluid. The breath sounds are distant to absent over the fluid proper but may be decidedly increased over the portion of the lung that remains functioning. During the examination the patient should be sitting up if his condition will permit. In this position, the fluid will gravitate into the basal region and here will be found the most marked changes in physical findings. It is well and wise to compare the findings in one side to those in the other. Small effusions may be difficult to diagnose; particularly is this so if the fluid is located in the right base posteriorly, but repeated examinations and observation should bring out a correct diagnosis. In case of doubt, no harm is done by putting a small needle (about a 20 gauge) into the chest, even making several exploratory punctures in search of the fluid.

### *Roentgenology*

Fluid collected in the pleural space retards the penetration of x-rays in direct proportion to the amount present. The patient should be standing or sitting, if at all possible. On the fluoroscopic screen or the x-ray film, the opaque shadow of the fluid will then be seen in the dependent portion of the chest unless extensive adhesions have previously formed. The normally sharp, acute costo-phrenic angle will be obliterated or flattened out in the

small effusion. As it increases in size, the fluid will run an elliptical course up the lateral chest wall towards the axilla and to a lesser degree up along the mediastinum. In a massive effusion, the involved side may be opaque all the way to the apex and encroach upon the opposite side. Fluid within a closed pleura does not show a fluid level. When a fluid level is present, there is always air above the effusion; either it has gained access to the pleural space by coming in through the chest wall through a needle, as in aspiration, or there is a tear in the visceral pleura connecting the space with the bronchial tree.

### *Differential Diagnosis*

Any patient who has a pleural effusion is most certainly due a careful and complete study by the attending physician. The true etiological factor should be ascertained, as many years of the patient's future life may depend on a correct diagnosis and proper treatment. The greater percentage of pleural effusions that come on suddenly are tuberculous in origin. Of course, effusions may follow acute chest conditions such as pneumonia and influenza, but these respective entities forerunning the effusion should not be confused with simple tuberculous effusion. Injuries to the chest wall involving the pleura are frequently followed by a non-infectious effusion. Malignancy of the chest, either primary or metastatic, may be accompanied by fluid. Here the age factor may be a lead; metastasis may be found in the opposite lung on the x-ray or located in other parts of the body. The fluid in a malignant effusion often has a reddish tinge, and red blood cells will be demonstrated. The fluid in a tuberculous effusion is straw colored when first formed and red blood cells are entirely absent. Severe cardiac decompensation may give small amounts of fluid in one or both pleural spaces, but here again pathognomonic signs and symptoms should easily dif-

ferentiate the two. Laboratory study of the fluid and animal inoculation are valuable means of diagnosing.

### *Treatment*

The major portion of patients with pleural effusion need no treatment other than bed rest and good hygienic care. The period of disability may be cut short by immobilizing the chest wall with adhesive or a binder during the acute stage of pain, putting the patient to bed and applying external heat. The ancient idea of removing fluid from the chest as soon as it is discovered is yet entirely too prevalent. This procedure is wrong in many cases and may lead to prolonged disability and unnecessary complications. Unless the patient is showing symptoms of cardiac or respiratory embarrassment, running unduly septic symptoms or a long drawn out course, the fluid should be let alone. The formation of fluid in the pleural space is one of nature's most efficient measures for alleviating acute pleuritic pain. It may often check or even arrest an underlying lung tuberculosis by putting it to rest by compression. In nearly every case when the pleuritic pathology has cleared sufficiently, the fluid will be absorbed slowly and entirely disappear. Evidence of pleuritic thickening may or may not remain.

If it becomes necessary to remove the fluid, this should be done under the most aseptic conditions. Closed aspiration with a moderate size needle by syringe or suction is the method of choice. Exceedingly large trocars should not be used as they traumatize the pleura enough to produce further fluid formation. Such traumatization is contra-indicated here as much as is any excessive injury to tissues during surgical procedures. Never should a rib be resected and drain inserted for simple tuberculous serous effusion for this will always lead to empyema. If the effusion is of tremendous volume and it is decided to remove a large portion of it, it should be replaced

with about 50 per cent of air by volume. This will prevent excessive shift in the mediastinum which might lead to shock and cardiac failure. Repeated aspirations are not indicated unless the above-stated train of symptoms return after the first aspiration. Should there be definite tuberculous involvement of any extent of the underlying lung, artificial pneumothorax should be instituted with the removal of the fluid and continued indefinitely.

If it is determined that the effusion is tuberculous in origin, the patient should have exactly the same orthodox treatment for tuberculosis as any other tuberculous patient. The clearing of the effusion and its accompanying symptoms does not mean that the patient is well. He should be told that he has tuberculosis and that he must have proper treatment over a long period of time—many months or even years. This type of patient will do much better in a sanatorium where he can have close observation and at the same time receive the fundamental tuberculous education so essential for his complete and lasting recovery. If he remains at home, the chances are that he will be over his acute symptoms, up and back at work within a few weeks, thus paving the way for extension and progress of his early tuberculosis.

### *Resumé*

By far the majority of pleurisy with effusion cases are tuberculous in origin. Any patient who has pleurisy severe enough to require strapping should be suspected of having active tuberculosis and treated as such. The treatment of effusion, per se, should be along conservative and expectant lines unless symptoms of prolonged toxemia, cardiac or respiratory embarrassment appear and then strictest asepsis and as little trauma as possible should be used in removing the fluid. Should there be a parenchymal lung lesion underlying the effusion as

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shown by x-ray, artificial pneumothorax should be instituted at once since delay will give time enough for extensive pleuritic adhesions to form, thus forever removing the patient's chance of taking it. If more time can be spent in examining our patients, fewer cases of effusion will be missed or called pneumonia, influenza and the like, and fewer patients will be

developing advanced tuberculosis "suddenly" several years after such attacks. Pleurisy with effusion may be the earliest symptom set up by our patients' natural immunological forces, and we as physicians should be ever listening and watching for every early symptom of tuberculosis, if we are to help in completely controlling the Great White Plague.

---

The Home Treatment and Management of Tuberculosis—(Continued from page 19).

tion and that is one of therapeutic value: the patient learns to meet people again, to change his line of work if need be, and, more important, to regain confidence in himself.

Sometimes a patient during this stage, and for the same reason, is taken into the doctor's office. He is taught to do simple laboratory processes, how to sharpen needles, sterilize pneumothorax outfits and even to act as chauffeur. Here, however, a small salary is paid.

The doctor's job is only half done if he does not stress the necessity of close follow-up through this period of working back into a normal life. Even then his

work is not finished, for the semi-yearly and yearly x-rays and check-up must go on and on.

There is nothing more satisfactory and yet at times more trying in the practice of medicine than to see the tuberculous individual recover and stay well year after year. If one sees an arrested case break it is to be believed, barring certain accidents, that the individual did not "cure" long enough the first time or his medical adviser failed him in not teaching him, and pounding it in, that the first stage of recovery is only the first and no more important than the transition and complete recovery phases.

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Furthermore, at this season, the mother is likely to bundle her baby to keep it warm, shutting out the sun from Baby's skin; and in turning the carriage away from the wind, she may also turn the

child's face away from the sun.

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Rest Therapy in Pulmonary Tuberculosis—(Continued from page 10).

Bed-rest frequently makes effective a partial pneumothorax which is ineffective if the patient is mobile.

Pneumolysis will allow a more complete collapse, but frequently the adhesion that holds the cavity open is so located that it cannot be reached.

Thorocoplasty should be done if the pneumothorax is not effective, but no thorocoplasty accomplishes as complete a lung collapse as a good pneumothorax.

The post-operative treatment, consisting of strict bed-rest, is necessary until fibrosis permanently closes the cavitated area; otherwise a splendid thorocoplasty may be rendered useless by the respiratory movements pumping in sufficient air to reopen the cavity.

In certain unilateral cases that have been successfully closed by pneumothorax the patient may not only be mobile, but may even continue at work if his general condition is good.

Active, aggressive treatment of the tuberculous has shortened the term of disability and made recovery more certain. Surgical adjuncts have made recovery possible for many who could not have survived by bed-rest unaided. However, tuberculosis cannot be regarded as merely a mechanical problem; a cavity to be closed or an affected area of lung to be shut off; but rather a disease which has produced for long periods of time systemic alterations that require both time and rest of the body as a whole, as well as rest of the affected area, for the restoration of normal functions.

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After a years time, I let the lower lobe out. I kept up the compression for five years, at which time, I allowed the lung to re-expand. On doing so, she had a return of the cough and sputum and moist rales over the upper lobe so I put the lobe down again. And the cavity that had formed before gas was begun was closed again. This girl was able to work after she had taken air for four months. She worked steadily, with no time off, except for an occasional cold.

At this time, she married and was confined and delivered of a healthy child eighteen months later. She had no trouble

during pregnancy. She took her gas regularly; her weight has steadily increased (it is 190 pounds now); she has never had any complications develop, or any fluid at all. She comes in for gas every six weeks.

I have to use a four inch needle, as her chest wall is very thick; and I have to go all the way up in the axilla. I give her about 150 c.c. with a balanced pressure reading. At present, she has a cap of air over the apex. This keeps the cavity closed.

This was a case of tuberculous pneumonia and I should have compressed her lung when I first saw her. Then she would not have developed a cavity and the compression would not have had to be kept up but for two or three years and she would have been a well woman. In intend to keep up the pneumothorax as long as I can. She is safer that way. Should trouble develop after it is stopped, she can have a first stage thoracoplasty.

We have been fortunate to have been able to keep up this collapse, as the patient has never been very cooperative, showing up for air whenever she felt like it. A basal metabolism test was made because of her obesity. It was negative.

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**The Treatment of Bronchial Asthma by Intratracheal Injections of Iodized Oil**—(Continued from page 16).

died. Three cases were lobar pneumonia in elderly persons; they recovered. The Roentgen ray examinations of the seven patients who recovered showed much oil in both lungs. Treatment was continued in four of them for months without recurrence of pneumonia.

There were no cases of edema, pleurisy, emphysema, or lung abscess following treatment, nor any evidence of infection having been carried into the lungs by the oil.

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*Summary of Treatment and Results*

NUMBER OF CASES TREATED-----260

*Group I.* Cases complicated by conditions such as hypertrophic emphysema, pneumoconiosis, healed tuberculosis, chronic laryngitis and tracheitis with extreme sensitivity of the bronchi in which this treatment has proved of no value--60

*Group II.* Cases not complicated with conditions specified-----200

(a) Completely relieved from one to eight years—180.

The average age was 39 years; minimum—5, and maximum—72. The average duration of illness was 12 years; minimum—4 months, and maximum—48 years. The average time under treatment was 10 months; minimum—3 months, and maximum—34 months.

(b) No satisfactory relief after at least six months' treatment—20.

The average age was 37 years; minimum—14, and maximum—72. The average duration of illness was 11 years; mini-

mum—1, and maximum 39. The average time under treatment was 12½ months; minimum 5 months, maximum 33 months. The average number of treatments was 17; minimum—6, and maximum—39.

*Conclusions*

1. A relation exists between the presence of the pathologic secretion in the bronchial tubes and the asthmatic paroxysm.

2. The relief which follows the removal of the pathologic secretion indicates a retention of some irritant in the tubes which is contributory to the asthmatic paroxysm.

3. Patients treated by intratracheal injections of iodized oil for bronchial asthma lost their clinical sensitiveness to former irritants.

4. Ninety per cent of the patients in whom asthma was uncomplicated by the conditions specified have been completely relieved by this method for a considerable length of time.

5. The treatment is a safe procedure and produces neither immediate nor remote damage to the lungs.

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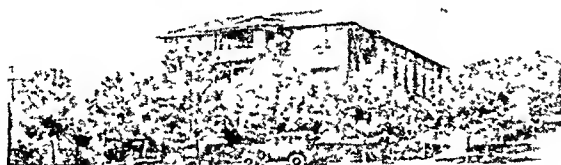
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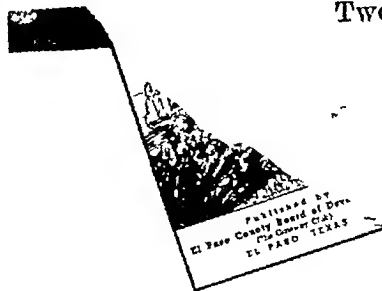
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|-------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|                                                                   | Jan  | Feb  | Mar  | Apr  | May  | June | July | Aug  | Sept | Oct  | Nov  | Dec  |
| TEMPERATURE<br>Mean monthly<br>(° F)                              | 49   | 52   | 57   | 63   | 71   | 77   | 82   | 87   | 89   | 81   | 67   | 49   |
| RAINFALL<br>(inches)                                              | 8    | 9    | 6    | 1    | 3    | 2    | 2    | 4    | 6    | 10   | 6    | 7    |
| Humidity<br>Monthly<br>(per cent)                                 | 61   | 56   | 44   | 40   | 28   | 23   | 21   | 25   | 33   | 47   | 57   | 61   |
| Monthly<br>and year<br>average                                    | 35.3 | 27.7 | 22.4 | 15.9 | 17.7 | 13.7 | 13.7 | 20.2 | 25.1 | 41.1 | 48.1 | 29.9 |



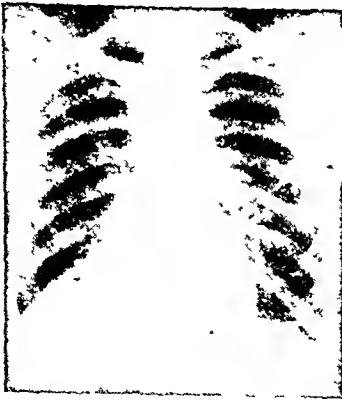
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*"This Open Letter is Addressed to Physicians and Officials connected  
with Industrial and Welfare Organizations."*

# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

MYRTLE AND VIRGINIA STREETS

EL PASO, TEXAS

March 1, 1937.

Gentlemen:

This is the *fifteenth* in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

It is the purpose of the Committee on Economics of the Federation of American Sanatoria to bring to the attention of physicians and to those officials who see large groups of patients, the facilities which the private sanatoria of this country have to offer to the tuberculous.

The first sanatoria in this country were established through private initiative and by private funds. We have come a long way since then, but our experience has taught us that individual private care can best be obtained in a private sanatorium.

The pioneers in the fight against tuberculosis have been the physicians in the private practice of chest diseases. They have kept in step with the modern trends of diagnosis and treatment. They are today, the members of the Federation of American Sanatoria and you will find them listed in our recent Pneumothorax Directory.

For your convenience, we have listed below the private sanatoria affiliated with the Federation of American Sanatoria. They are the finest private sanatoria in the United States and they are well equipped to cater to the welfare of your patients. Elsewhere, throughout this journal, you will find individual listings of these sanatoria.

For further particulars address any of the sanatoria or write to the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,  
Federation of American Sanatoria.

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August 18, 1936, at the post office  
at El Paso, Texas, under the Act  
of August 24, 1912.

*"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

**A Proclamation** THE GOVERNOR of Texas has set aside, by proclamation, the month of April as "*Fight Tuberculosis Month*" in Texas, declaring that the protection of the people is generally recognized as one of the fundamental concerns of a government dedicated to the "general welfare". He further states, "the dread disease of tuberculosis each year takes the toll of some of our finest citizens, young and old, rich and poor. Governor Allred's proclamation was made since the Texas Tuberculosis Association will sponsor an educational campaign during April, calling attention to the need of protecting children of high school age against the ever present danger of the great white plague.

Governor Allred urged that every man, woman and child, of the state, learn the basic facts about this disease, and its prevention, especially in young people in order that it may in time be eradicated from within our borders. It is encouraging to have the Governor of a great state assist in such a manner. We have stated on other occasions, in these columns, that the control of tuberculosis should be carried out by the Public Health Principals as applied to other infectious and contagious diseases, namely, by the segregation of the open case of pulmonary tuberculosis. When this principal has been carried out the protection of not only the young, but of the entire population

will have been carried out. Educational campaigns are of great value, we can teach the child better methods of living and self protection for his general health, but education will scarcely protect him from the dangers of infection, while we permit open cases of pulmonary tuberculosis to spread the disease. C. M. H.

**Military Surgeons' Exhibit** THE ASSOCIATION of Military Surgeons of the United States announces the appointment of Mr. Robert Lewin as Director of its convention exhibits.

Mr. Lewin has very successfully directed the commercial exhibits of the Association of Railway Surgeons and the American Association of Orthopaedic Surgeons for a number of years. This year he is also directing the commercial exhibit held in conjunction with the International Fever Therapy Conference at the Waldorf-Astoria, March 29th, 30th and 31st, 1937.

The commercial exhibits of the Association of Military Surgeons have been creating more attention each year and the exhibitors have found this to be a highly profitable meeting.

Anyone desiring information in connection with the Military Surgeons 1937 convention to be held at Los Angeles, October 14th to 16th, the American Association of Orthopaedic Surgeons held at the Biltmore Hotel, at January 15th to 19th, 1937.

sociation of Railway Surgeons meeting to be held September 21st to 22nd at the Palmer House in Chicago, or the International Fever Therapy Conference, as above mentioned, should address:

Mr. Robert Lewin, 505 N. Michigan Avenue, Chicago, Ill.

P. J. M.

**Medication in** IN THE application of ther-  
**Pulmonary** apentic measures in tuber-  
**Tuberculosis** culosis there is frequently

a tendency upon the part of most all of us to become too narrow. We are too prone to become satisfied with one line of treatment which we apply as a routine to all patients without a proper study of the individual.

There can be no question that some form of surgical treatment, preferably artificial pneumothorax if its application is possible, is indicated in a good majority of tuberculous individuals, and, indeed, is the treatment *par excellence*, but even where it can be successfully administered is it fair to the patient to fail to apply other measures which should add to his chance of recovery, or at least encourage a more rapid improvement in his general condition?

There is a pretty generally accepted opinion that in almost all patients suffering with tuberculosis there exists a low blood calcium content, and it is just as generally believed that a surplus of calcium is needed in the proper healing of tuberculous lesions. If such is true, it is our feeling that in all cases, even though successful compression has been obtained, calcium should be administered for a time, the length of time depending, of course, upon the individual patient and the rapidity with which he responds to treatment.

In most every tuberculous patient there is a certain amount of secondary anemia. The extent of this should be determined, of course, by proper examination of the blood and when it is at all marked this patient should have Iron and Arsenic, in addition to the calcium. In most cases

it should be given intravenously, as is true with the calcium, because the results have been found to be much more satisfactory when it is given that way.

In many patients the general condition of the flesh and strength is below par and these should be built up as rapidly as possible. A study of the vitamins should be made in these cases and such treatment applied as would seem most indicated.

Cod Liver Oil is now supplied in many ways and is still one of the best remedies as a general builder in any condition where the patient is below par. It is none the less so in tuberculosis. We admit that many cannot tolerate Cod Liver Oil in its natural form but in its concentrated form, prepared as we can now obtain it, some preparation will be found which almost any patient can tolerate and it should be administered when possible. Haliver Oil and Viosterol can be used as a substitute for Cod Liver Oil when it is not well tolerated. Malt preparations and many others, with which most physicians are familiar, should be used when indicated.

Where the patient's appetite is poor, the bitter tonics are indicated in tuberculosis just as in any other condition and should certainly be used.

Our point in making these remarks is to emphasize that we should not depend too much upon one line of treatment, even in patients who are getting good results from the so-called "rest treatment". These results would probably be more rapid if some of these other lines of treatment were added. Let us not become too narrow in the treatment of this disease.

R. B. H., SR.

**Tuberculosis Editors' Association Elects Officers** THE FOLLOWING were elected to office for the year of 1937 by the Associated Editors of Tuberculosis Publications: President, Murray Kornfeld, El Paso, Texas, Managing Editor, "Diseases of the Chest"; First Vice-President, Roy W. Henson.

State Sanatorium, Texas, Editor, "*The Chaser*"; Second Vice-President, Myrtle Rockwood, Perrysburg, New York, Editor, "*Grit - Grin*"; Secretary-Treasurer, Mrs. W. M. Harman, Verona, New Jersey, Editor, "*The Buzzer*"; Board of Directors: Lorne L. Clemes, Howell, Michigan, Editor, "*The Lamp Post*"; Carey Holbrook, Albuquerque, New Mexico, Editor, "*Health City Sun*"; Suye Narita, Mt. McGregor, New York, Editor, "*The Optimist*"; William L. Sullivan, Howell, Michigan, Editor, "*The Lamp Post*"; and William H. Fitzimmons, Hamilton, Ontario, Canada, Editor, "*The San-towner*".

Due to ill health, Mrs. Harman will not be able to assume office and Suye Narita, Mt. McGregor, New York, will serve as the Secretary-Treasurer.

It is the purpose of this organization to be of mutual assistance in obtaining and publishing material and data on tuberculosis and wherever possible to raise the standards of the member publications.

Diseases of the Chest is happy to be a member of this association and our Editorial Board appreciates the honor bestowed upon our Managing Editor.

C. M. H.

**Hoarseness** HOARSENESS is a condition found in various conditions affecting the proper functioning of the vocal cords. The condition should always be regarded seriously. It is our duty to ascertain why hoarseness is present and to determine the best methods for the removal of the cause. If we find remote and constitutional causes underlying the local laryngeal condition, we will exhaust, in many instances, all diagnostic agencies at our command, such as Wassermann tests, physical examination of the chest, x-ray study of the chest and larynx, a careful study of the heart, keeping in mind the possibility of hypertrophy, aneurism, enlarged mediastinal glands, tumors and foreign bodies. X-ray exam-

ination of the larynx may reveal the presence of unsuspected foreign bodies. It should be remembered that the finding of tuberculous lesions in the lungs does not preclude the possibility of the patient having syphilis.

Although many cases of hoarseness may be due to the presence of laryngeal tumors, malignant or benign, to syphilis, tuberculosis and paralysis of different laryngeal muscles, it is not to be assumed that there is no such thing as a simple acute or chronic catarrhal laryngitis. In the case of acute laryngitis, the diagnosis is simple, because of its short duration. In the cases of chronic hoarseness, the underlying causes should be searched for, not forgetting, that chronic hoarseness is one of the early signs of a tuberculous involvement.

C. M. H.

**Internal Conference IN CONJUNCTION with on Fever Therapy** the International Conference on Fever Therapy to be held at the Waldorf-Astoria Hotel on March 29th, 30th, 31st, 1937, there will be a scientific and commercial exhibit staged.

The clinics will be held at the College of Physicians and Surgeons, Columbia University, New York City.

A large attendance of fever therapists from all over the world is expected. A very interesting and instructive program has been arranged and all of those who plan to attend the conference are urged to register promptly with the general Secretary, Dr. William Bierman, 471 Park Avenue, New York City. The registration fee is \$15.00.

P. J. M.

## ERRATA

FEBRUARY, 1937 issue; *Standardization of Tuberculosis Case Finding Procedure in Schools*, by Charles I. Silk; page line 15; "Fourth, that the results lead to the discovery of factors at sources of infection"

# Medical Economics

THE ECONOMIC situation that worries the medical profession today has worried the same profession since the dawn of civilization. The Greeks had a word for it, and took steps in the fifth century B. C. to correct what they considered an intolerable condition. The country was over-run by itinerant physicians who wandered from town to town caring for the sick. As soon as the ills of a given village were overcome, the doctor moved on, leaving the community without medical care. The wise ones of the country took up a purse and paid the medical man a salary to stay put. Thus was socialized medicine born and it has lived with us ever since.

Rome had no doctors, but cured the ills of the populace by magic or religion. The one worked as successfully as the other, until the Greek medics filled up the country by the second century B. C. and allowed the victims to die without benefit of clergy.

The Christians, however, built charity hospitals to care for the unfortunate. These were followed by the Guilds, whose institutions are preserved to this day, and led to our present sickness insurance, both private and state.

In 1818 Germany passed legislation establishing socialized medicine by a tax on the rich;—the poor escaped. The physician was paid a salary for his work and allowed a private practice. In 1883 this same country passed a bill for compulsory health insurance. This type of legislation was followed by Austria in 1888 and by Hungary in 1891. By 1900 all the countries of Europe including England had some form of health insurance.

Russia is the only country in the world in which state medicine exists. A doctor is on salary, is paid by the state, is under government supervision. It is interesting to see how

BY  
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the entire economic experiment would ultimately work out, but watching from the side lines, one feels that the Fascist countries will force the Soviet union into a defensive war and ruin the attempts so far made to establish the first socialist state in the present-day world.

America is far behind the continent in any attempt to solve the medical economic situation. This is no doubt due to the fact that when our democracy was born on the Atlantic seaboard eighty per cent of the people owned their means of livelihood, and the other twenty per cent worked for this eighty. The farmer, the blacksmith, the watchmaker, the baker and candlestick maker—all had their means of security. The apprentices who worked for them learned the trade and established a place of their own. The country doctor was a part of all this economic hook-up. If he didn't get paid in money, he received its equivalent and was able to enjoy a rich life and do his part for humanity. This Utopia went on in much the same way until 1830 and from that period to 1870, as the industrial age made its fangs felt in man's economic life, living conditions were becoming more and more unstable for the average individual. Now twenty per cent of the people own all the wealth and the other eighty per cent are working for them on salary or wages. Not one of the eighty per cent owns the means of livelihood. In other words, they couldn't live on the property they own—because for all practical purposes they are without property.

The medical profession faces today the same situation that the captains of industry find confronting them. In fact, organized medicine bears the same relationship to the economic situation as does organized industry. And neither seem to see the handwriting on the wall.

Whenever a depression or a crisis occurs in the economic set-up, literature is filled with solutions for the vexing problems. Economists, both lay and medical, fight for the privilege of curing the ills both of the flesh and of the body politic. If someone steps slightly to the left, he is immediately put down as a Communist, a Red, a Bolshevik, or what not. The term means little. It is a title conferred on him who does not believe that this is the best possible of worlds.

Organized medicine as represented by the American Medical Association stands for the capitalist in medicine. The men in the higher income group want no change—they are satisfied with things as they are. But here again we must face the fact that the higher income brackets represent only the minority of the practitioners of medicine. The average income before the crash in 1929 of one-third of the medical men of this country was less than \$3,000 yearly, and of one-half, less than \$3,800 yearly. These small-income doctors are already under socialized medicine, such as salaries or contract practice, or are starving in private practice.

Naturally this group, like the salaried or wage-earning group in industry, are glad of any change that spells security for them. And the voice of the majority in any situation spells change whether you want it or not.

The attitude of the American Medical Association—opposition to all attempted reforms with no constructive thought in lieu of these reforms—only adds fuel to the flames and gets us nowhere.

Even the American College of Physicians opposes this attitude by editorial comment in the *Annals of Internal Medicine*, and the American College of Surgeons passed resolutions resenting such interference, but rescinded their action after pressure was brought to bear, stating that hereafter the economic affairs of organized medicine would be left to the American Medical Association. This *laissez faire* "it can't happen here" attitude will bring the house of cards tumbling on our heads and usher in socialized

medicine, or worse, state medicine, in a capitalist society during the life-time of the present generation.

When a patient calls his doctor he is paying for service the doctor has to sell. The doctor does or should give the patient something for his money, and the patient should expect to pay for this something. It is a business arrangement which should be beneficial to both and both should have a voice in the arrangement. This, however, is not the attitude of organized medicine. The doctor and the doctor alone should be judge and jury and the patient made to like it whether or not.

The world is full of large numbers who cannot budget for medical care. They can budget for groceries, clothes, rent, and all fixed expenditures, but disease is an unknown quantity. When it stalks into the home this group either has no medical care or contracts a large debt which it is unable ever to pay. The doctor and the patient both lose and both suffer because of the attitude of organized medicine which blocks a solution.

The present chaos is the result of the industrial age. Each decade increases the cost of living; the luxuries of yesterday are the necessities of today, nor have the doctors neglected to add to the cost of medical care.

In my early years, a mother could give birth to a baby in her own home. Now she must be rushed to the obstetrical ward of some hospital. There the nurse watches the course of child-birth and calls the doctor in time to tie the cord and usher a new soul into this chaotic world. The medical attendant spends fifteen minutes where he used to spend the night. Child-birth has been made easy for the doctor by added expense to the patient. At one time a child could be born for ten to fifteen dollars, where now it costs from one hundred to one hundred fifty, to produce no better offspring. In fact, great obstetrician made the statement that chances of infection were less in the general hospital than

(Continued to —

# Office Treatment of Pulmonary Tuberculosis

THE PATIENT who comes to the office with symptoms suggestive of some disease of the chest must have a complete and careful study. Unless the history is carefully elicited and a complete examination made, with such laboratory studies as the history and examination may suggest, some important condition, the cause of the complaints, or an important contributory factor, may be overlooked.

It is the plan of this office to have every patient, at his or her first visit, have a very careful and complete history taken before physical examination is begun. If this history suggests blood chemistry or other laboratory study, this is done before the patient is seen by me. In addition, our routine laboratory examinations consist of complete blood counts and urinalysis. The height, weight, temperature, pulse, respirations, vital capacity and blood pressure are recorded. The examination is begun in a systematic manner. First, a preliminary neurological. If this is done every time, inequality of pupils, abnormal reflexes and abnormal eye ground findings will not be missed. Examination of the nose and sinuses, if indicated, is then made. Chronic cough is frequently due to infection in the paranasal sinuses. A chronic bronchosisinusitis has frequently been mislabeled tuberculosis and I have had such cases referred to me for induction of artificial pneumo-thorax. Careful study proved the patient entirely free of tuberculous infection. Examination of the mouth requires careful study of the teeth, gums, tonsils and the lymphoid tissue in Waldeyer's ring. Lymphoid tissue in the lateral walls of the posterior pharynx, when inflamed, gives rise to temperature non-productive cough. The thyroid be carefully palpated and at the the pulse rate, the presence or tremors and eye symptoms metabolic rate may clear

BY  
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up the diagnosis. Many a case of hyperthyroidism has gone under the name of pulmonary tuberculosis or neurosis. The same is true of the occasional simple thyroiditis, which must be kept in mind. While one is observing the extended hands for tremors, he notes the absence or presence of clubbing of the fingers, cyanosis or other signs in the fingernails. A study of the glandular system and physical examination of the chest, completely stripped, is begun. Measurements including the antero-posterior diameter and the width of the chest, help give a written picture of the shape of the chest. The posterior part of the chest is first examined with particular attention to the position of the spine and any abnormalities; to the absence or presence of tenderness. The question of undue prominence of the transverse process of the cervical vertebra or cervical rib must be kept in mind to avoid pitfalls in diagnosis. In addition to tenderness (Petruschky sign), the vertebra can be percussed for impairment (Koranyi sign). D'Espine's sign can then be elicited; the size of the Kronig fields; the question of lagging; the question of impairment to percussion and the movement of the diaphragms. Auscultation must be done in a quiet room. After careful listening, it is wise to have the patient cough after a full expiration and then take a deep breath. Rales otherwise not heard may now be brought to light. Sounds due to friction of stethoscope on a hairy chest must not be mistaken for rales. The right and left axilla are examined in a similar manner, then the anterior portion of the chest. The breasts should be carefully palpated for possible lumps or early malignancy. The heart should be examined. The cough, hemoptysis, and easy fatigue of some patients with mitral stenosis has been mistaken for tuberculosis. The mitral murmur is

sometimes difficult to obtain except by changes of position or exercise. A roughened first sound at the apex, an accentuated second pulmonic or mitral configuration should put one wise. The chest is not completely studied until careful fluoroscopy has been made in a dark room. Where this is not conclusive, carefully taken stereoscopic films should be made. The abdomen, rectum, and genital organs may now be studied.

This careful examination will frequently bring to light, conditions that otherwise would be overlooked. The patient, impressed by the care and pain you have taken, is in a psychological state to cooperate with your line of treatment. This is essential in chronic chest cases. A complete inclusive diagnosis should be made at the first visit, or where this is not possible, temperature records, sputum, sedimentation tests, or other laboratory studies should be carried out so that an accurate, all-inclusive diagnosis can be made. Then one must outline the treatment. Whenever possible, give patients written directions. It is surprising how much more carefully patients will carry out orders given in this manner, than when the perfunctory method of telling them a few things to do and a prescription to get filled is carried out.

It is sometimes stated that when in doubt, the diagnosis of pulmonary tuberculosis should be made and the patient treated as an element of safety. This is not wise. In our imperfect social order a wrong diagnosis places a heavy burden on the patient. Such an individual may have difficulty in associating with his friends or in obtaining proper employment. Some individuals develop phthisophobia which is almost as bad as the disease itself. One should be more than moderately certain when a diagnosis of tuberculosis is made that the patient is afflicted with that disease. No one single test, except presence of bacilli, can be considered pathognomonic.

I would warn against the type of hunch described by Dr. Victor Heiser in his "An American Doctor's Odyssey," in which

he would attempt to diagnose pregnancy by the fact that a strand of hair on the left side of an immigrant woman's head hangs dull and lifeless over her left ear; or hernia by a man's gait; or valvular heart disease by ridged nails. To avoid pitfalls, one must keep in mind the most common things such as tuberculosis, bronchial asthma, bronchiectasis, pleural effusions, emphysema and bronchitis. If careful examination excludes these, then the more uncommon conditions such as abscess, malignancy, syphilis, actinomycosis, dermoid cyst, etc., should be considered.

### *Clinical Examples*

A boy of 18 (J. L.) came to see me March 26, 1936. His family and social history were irrelevant. He lived on a farm. Since the age of three he had had bronchitis, which became worse every winter. The only childhood disease was pertussis. During the last few winters when he acquired a cold he had profuse foul expectoration, which was considerable in amount on arising. In warm weather his symptoms subsided. He now complained of night sweats, loss of weight, and marked asthenia. He had been at absolute rest for a period of two months. The boy is 63 $\frac{1}{4}$ " in height, weight 85 $\frac{1}{4}$  pounds; temperature 99.2; pulse 144; respirations 40; vital capacity 1100 cc.; blood pressure 106/88. He appeared extremely emaciated. Neurological examination and that of the eyes and ears were negative. There were caries of the teeth. His tonsils were absent. There were no thyroid symptoms. Width of the chest 23cm. and anteroposterior diameter of the chest 16 cm. Physical examination of the chest disclosed a multiplicity of findings. There was hyperresonance in parts and flatness in others with all types of rales. The fluoroscope showed presence of air and fluid in right pleural space. There was also an exudative mass in opposite lung. The sedimentation very rapid going down to 31 in 1 hour. Leukocyte count 16,000.

cent polys, 6 per cent small lymphs and 2 per cent large lymphs. 1500 cc. of a foul smelling pus was removed. Sputum and pus carefully studied, including culture methods, showed haemolytic streptococci and an absence of tubercle bacilli. Whenever a great deal of pathology is found with clinical evidence of active bacterial infection in the lungs, careful repeated examinations of the sputum should show tubercle bacilli, and when these do not, one may safely exclude tuberculosis. In addition, this boy's history, leukocytosis and high poly count and absence of apical involvement should have been sufficient to exclude it. He was referred to a local hospital where stereoscopic films were made of his chest and laboratory studies done. It was concluded that he had advanced pulmonary tuberculosis and was to be discharged since nothing could be done for him as the condition was too far advanced for any type of treatment. In view of my examination, however, I insisted that the interpretation of the x-ray was wrong, especially in view of the fact that including animal inoculation, no tubercle bacilli could be found. The boy was referred to the surgical department of Temple University where Dr. W. Emory Burnett on June 24, 1936, did a rib resection for the right sided empyema and on July 22, on the left side. The patient improved considerably, but unfortunately the prolonged drainage of pus from the bronchial tree produced bronchiectasis in both lower lobes. Because of the probability that the boy would not be well unless this was eradicated, that he would continue to bring up foul expectoration and run the chance of the local pathology spreading to the other tissue, and that he would either die of extensive bronchiectasis with its associated pneumonitis, or possibly develop a metastatic brain abscess, lobectomy was considered. This was performed September 7th and although the boy is now at Temple Hospital under the observation of Drs. Burnett and Chevalier, his prospects now are for com-

plete recovery. Laboratory studies of specimens removed disclosed no evidence of tuberculosis.

On December 8, 1933, a man (Wm. B. M.) was referred to me as to the advisability of artificial pneumothorax. He was supposed to have had pneumonia followed by an abscess and now he had night sweats, evening temperature, cough, and felt tired. Important points in the physical examination: impairment of the upper left and middle portion of the right lung, impure breathing central portion, impure breathing on the left side, slight enlargement of the heart with accentuation of the second pulmonic sound and soft systolic murmur at the apex. Examination of the sputum on three consecutive occasions was negative for tubercle bacilli. My diagnosis was mass at the base of the right lung, probably lung abscess. He was placed at rest for observation, gained four pounds in weight, and seemed improved. X-ray studies showed a primary growth in the middle lobe with suppurative lesion in the lower lobe. He was referred to Dr. Howard Lilienthal for pneumonectomy. Biopsy of material obtained by bronchoscopy showed squamous cell carcinoma. On February 19, 1934, the right lower lobe was removed. It showed multiple abscesses and no carcinoma. He died March 7, 1934, and the post mortem by Dr. S. Jarcho showed: "1. Squamous cell carcinoma in stump of right lower lobe bronchus with very slight infiltration and no metastases. 2. Acute fibrinopurulent pleuritis over right upper lobe and right middle lobe and diaphragm. 3. Small area of bronchopneumonia in right middle lobe. 4. Acute suppurative pneumonia in left upper lobe with many small abscesses. 5. Parietal thrombus on wall of left auricle at site of ligation of pulmonary vein. 6. Infarcts: spleen, kidney and liver."

The termination of this case was very sad. It showed, however, the futility of treating the patient as a tuberculous patient.

I was requested to express an opinion

about the advisability of sending a young man of 24 to a tuberculosis sanatorium, the diagnosis having been made in the State Clinic and having included stereoscopic x-ray studies. My examination showed considerable pathologic findings in the base of the lungs with repeated negative sputum, and definite suppuration of the paranasal sinuses. This led to a diagnosis of bronchosinusitis and possible bronchiectasis, which was confirmed by Dr. Chevalier Jackson of Philadelphia who after bronchoscopic drainage felt that the suppurative bronchitis would probably be relieved by subcutaneous injection of an autogenous vaccine made from the pus obtained from suction of the bronchial tree plus eradication of the sinus infection. Dr. Chevalier Jackson reported that the aspirated secretion showed no tubercle bacilli and one culture showed non-haemolytic staphylococcus, non hemolytic gray streptococcus, and pneumococcus. Dr. W. Edward Chamberlain of the Department of Radiology at Temple, reported in his conclusions, "The localization and type of bronchiectasis in this case is quite characteristic of that which is secondary to upper respiratory tract infection." The x-ray of the sinuses showed "Pansinusitis of the hyperplastic type with involvement of the left maxillary antrum much greater than that of any of the other sinuses."

These are a few of the interesting cases that show the error of jumping at conclusions. It likewise disproves the idea that x-ray is an infallible method of diagnosis. X-ray is one of the most important links and methods used in the diagnosis of diseases of the chest. It is not "the be all and end all" of diagnosis. The personal element in diagnosis will never be displaced by mechanical instruments. One must also remember there are x-ray films and x-ray films; there are roentgenologists and roentgenologists.

Of course, the finding of tubercle bacilli is absolutely pathognomonic, but in the absence of tubercle bacilli, the x-ray plus hemoptosis or other clinical findings are

extremely important. One must recall that hemoptosis does not always mean tuberculosis and many patients have spent years in sanatoria because of this one sign who at post mortem showed no evidence of pulmonary tuberculosis.

Where an occupation of an individual subjects him to inhalation of dust like rock dust, etc., pneumonokoniosis must be kept in mind. Silicosis is common in the Anthracite regions. Silicosis is not a preventor of pulmonary tuberculosis, any more than bronchial asthma, emphysema, or any infection of the respiratory tract. When two or more conditions of the chest exist, the difficulty of diagnosis is multiplied. The diagnosis of pulmonary tuberculosis having been made, one must decide whether the amount of involvement is far advanced, moderately advanced, or only minimal; whether it is unilateral or bilateral; whether with cavity formation or without cavity formation; whether associated with pleural thickening, etc.; whether the patient is mildly septic or is free of temperature or seriously ill. One must check on body weight; the presence or absence of infection elsewhere in the body; social status and psychological condition of patient and members of the family. A certain percentage of patients will not do well at home. These should be referred to a sanatorium. The sanatorium selected, whether it be free or pay, should be one that is well equipped. It should have an x-ray department with a competent roentgenologist to properly interpret films, and a laboratory. The institution must have either resident physicians or full time men. A tuberculosis sanatorium that depends only on visiting chiefs without any physician at the institution is unfit to care for such a patient. The institution must be prepared to give artificial pneumothorax or oleothorax where indicated. It would of course, be ideal if such an institution either had, or were in affiliation with, a surgical department for the surgical care, for every case where surgery is not indicated such

## Some Practical Aids in the Diagnosis of Pulmonary Tuberculosis \*

IT IS ALWAYS well to begin any diagnostic approach with a good history. I once heard an eminent chest specialist state that he could be reasonably assured after taking a thorough history whether or not the pulmonary disease from which the patient was suffering was tuberculous or non-tuberculous. A careful and well taken history not only unfolds the story and evolution of the patient's illness; not only depicts the chronological parade of significant events and developments; but it gives you the social, economic and moral background of that individual. This is so often important. The history itself is not infrequently highly suggestive if not diagnostic of the disorder with which you are confronted. Here are a few examples wherein the history serves in this way. An individual complaining of a slight cough of three months duration, of gradual loss of weight, of noticing a definite tired feeling or loss of pep, of having on one occasion coughed up a mouthful of blood, of having had an attack of pleurisy five years ago, an anal fistula two years ago which is still draining, and whose mother died from tuberculosis—such an individual is without question suffering from pulmonary tuberculosis and no further examination is required to make this diagnosis. Another patient has developed chills, fever, and sudden but copious expectoration of foul-smelling sputum ten days following an operation for removal of tonsils. This history is strongly suggestive of lung abscess. Again an individual having a cough with expectoration of large quantities of sputum over a period of many years with little impairment of the general health indicates that a chronic bronchial disease, such as, bronchiectasis, is the most likely disorder in this case.

BY  
CHAMPNEYS H. HOLMES, M.D.  
Atlanta, Georgia

The very characteristic chill, stitch in the side, high fever and prostration of pneumonia is well known. Likewise the typical paroxysm of cough with suffusion of the face, vomiting and the characteristic whoop of whooping cough is a picture not easily to be forgotten. There is no need for more than passing mention of the picture so familiar to us all seen in a severe asthmatic seizure. A productive cough with onset before the age of ten and after the age of forty years is most likely not due to tuberculosis. A productive cough for many years with little impairment of the health is a commonly recorded story in fuso-spirochetal disease. When cough, rapid decline in health, blood spitting, slight wheezing, and pain in the chest develops in an individual past middle life, cancer of the lung should be strongly considered as the condition confronting you.

Now I should like to give a few comments on two or three symptoms commonly encountered in pulmonary disease. First, cough: It is wise to view any cough persisting over a period of three months as due to tuberculosis until proved otherwise. Where severe coughing with profuse expectoration is due to tuberculosis, you may feel assured that the disease is in a far-advanced stage. While a slight hacking cough is most frequently noted in early tuberculosis, there is no cough characteristic of tuberculosis. In very early disease there is no cough and even in advanced disease cough may be slight or absent. A patient often denies a cough but admits clearing of the throat with expectoration. A morning cough with mucoid expectoration is fairly common among the excessive users of tobacco and dwellers in a city where carbon in the atmosphere abounds. The sputum in these cases is often brownish to black. Now another most important symptom is hemoptysis or the coughing and spitting

out of blood. The occurrence of this without an obvious explanation is presumptive evidence of the presence of pulmonary tuberculosis, and in over 90 per cent of the cases this diagnosis will be confirmed by subsequent examination. It must be kept in mind, however, that blood spitting may be encountered in other conditions, some of which are pneumonia, lung abscess, new growth, bronchiectasis and certain forms of heart disease. Finally, along with hemoptysis, another symptom highly suggestive of tuberculosis is pleurisy. Every case of pleurisy without an obvious explanation and particularly the wet variety—pleurisy with effusion—should also be considered presumptive evidence of a tuberculous infection and these individuals should be handled accordingly. It is my opinion after studying many cases of tuberculosis over a number of years, that a great many of the so-called attacks of pneumonia in the past were in reality attacks of pleurisy.

In performing the physical examination it is essential that it be done in quiet surroundings. A satisfactory examination of the chest can not be made otherwise. A doctor having offices in one of the modern office buildings should reserve an inside room for this purpose. Probably the most important point in making a satisfactory chest examination, and the one that is most often violated, is concentration. Failure of concentration is like "looking up," in golf. Thinking of the game of bridge that night or the fishing trip tomorrow while percussing or listening to the chest, precludes proper interpretation of these arts. I find it of practical value to orient the heart first. Also I find that a quick comparison of the two lungs before a meticulous examination is made proves to be most helpful. My readers probably do not have to be reminded of the importance of the expiratory cough. It is of such paramount importance, however, that I feel obliged to make mention of it. The fine crepitant rales of an early infiltration can be heard only in this manner. Generally speaking, I believe light percussion of greater value

than heavy or medium, and would like to emphasize the importance of feeling the resistance to the fingers when percussing. Creditable percussion can be done by a deaf person for this reason. Fluid in the young patient is often overlooked because the characteristic absent or suppressed breath sounds are not present. The most valuable physical sign in these cases, and in fact most all cases, is the wooden flatness of the percussion note. I have observed a similar percussion note over an infiltrating carcinoma. It is a practical point, worth keeping in mind, that the fluid in patients under ten years of age is usually purulent. I believe the most valuable sign in detecting small areas of consolidation is the use of the whispered voice—traveling rapidly over the chest with the bell of the stethoscope.

No chest condition is thoroughly and completely studied without the use of x-ray films. Caution is advisable because of the danger of poor films. Poor films not only fail to reveal the trouble, but in themselves may be misleading. I believe a flat film should be studied in addition to the stereo films, as the latter have a tendency to minimize the findings. The information obtained from lateral views must not be overlooked. Tuberculous glands behind the heart are seen only on such films. With experience, considerable proficiency can be obtained with the fluoroscope. The fast screen that we have at the present time is a considerable additional advantage. The taking and studying of serial films particularly upon serial view boxes gives a running story of the case that is most graphic and illuminating.

The most practical and the most valuable laboratory examination is the examination of the sputum. The material is readily available; the process requires a short time to perform, calls for no elaborate equipment, and gives significant tangible findings. Tubercle bacilli, fungusiform organisms, blood, pus, and elastic fibers are the most significant findings looked for. A persistent

(Continued on page 2)

# Manometry in the Conduct of Artificial Pneumothorax

WHEN SAUGMAN in 1906 introduced manometry into the practice of inducing artificial pneumothorax, he

BY  
SYDNEY JACOBS, B.S., M.D.\*  
New Orleans, Louisiana

converted a previously unsafe procedure into a surgical operation whose risks could be reduced to a minimum. The earlier workers in the field of collapse therapy, notably Carlo Forlanini and John B. Murphy, were obliged to induce pneumothorax without benefit of this valuable technical assistance. It is more than a coincidence that pneumothorax therapy became more generally accepted after this time.

Unfortunately too little attention has been paid to the recording of intra-pleural pressures and to the information gained from studying them. The physiological principles and their application are relatively simple and need only a fairly brief discussion.

In the "potential" space existing between the visceral and parietal pleurae there is normally a tension which reflects the inherent elasticity of the lung tissue. Atmospheric air enters the bronchi, distends the lung and causes it to adhere closely to the chest wall; as the lung becomes distended, there is produced the natural reaction which is that of recoil of the distended elastic tissue of the pulmonary parenchyme. The chief factor responsible for the production of the intra-pleural pressure is therefore the interplay of the pulmonary distension and the elastic recoil of the lungs. Anything causing diminution of pulmonary elasticity, such as emphysema, will reduce the intra-pleural pressure; anything increasing the compression of the lung, such as atelectasis, will increase this intra-pleural pressure. During respiration, there is a cyclical variation in intra-pleural pressures.

In inspiration, the muscular contraction causes the thorax to expand, more air is permitted to enter the lungs,

and the bronchi are distended with air; therefore the atmospheric pressure in the bronchi is much greater than the pressure in the pleural space, and the intra-pleural pressure accordingly falls below that of the atmosphere. During expiration, the thorax contracts, air is forced out of the bronchial tubes, the elastic recoil of the lungs causes the pulmonary alveoli to collapse, and the pressure in the intra-pleural space approaches that of the atmosphere although it does not quite equal it. On most systems of registration, the pressure of the atmosphere is recorded as "neutral" or "zero"; therefore any pressure which falls below that of the atmosphere must be lower than zero or "negative," and any pressure above that of the atmosphere must be "positive". In this sense, a so-called "suction" or "negative" pressure in the thorax is only one below that of the atmosphere. During inspiration, the intra-pleural pressure is generally 6-10 cm. below that of the atmosphere or is "minus 10 to minus 6", while on expiration it is normally 4 to 7 cm. below that of the atmosphere or is "minus 4 to minus 7". When pressures are to be determined, the subject should always assume the same posture; changes in posture of the subject are associated with variations in the intra-pleural tensions.

To determine the intra-pleural pressure, there are needed a needle, a water manometer and rubber tubing to connect the needle to the manometer. These are incorporated into the modern pneumothorax apparatus as a rule. Generally the manometer consists of a U tube filled with water. Theoretically the bore of the manometer should be the same as that of the needle, but this is not feasible. The manometer tubing should be of 3-5 mm.

inside diameter, and if a needle correspondingly as small as that were used, it would not register the fluctuations properly. So small a needle might be easily corroded or occluded by water from the sterilizer or by blood or tissue encountered in the puncture of the chest wall incidental to the performance of pneumothorax. Too large a needle would cause excessive traumatism to the chest wall. Most authorities insist on a needle of 17-20 gauge; in the Pneumothorax Clinic of Tonro Infirmary, it is customary to employ a 19 gauge needle. The connecting rubber tubing should be as short as is practicable for the apparatus employed. If it is too long, slight changes in pressure will not be recorded on the water manometer quickly enough to be detected in the usual procedure.

As the needle is passed through the anaesthetized chest wall, there will be no fluctuations of the fluid in the manometer until the tip of the needle lies just outside the parietal pleura. Here there will be seen slight fluctuations about the atmospheric level (0), but these do not indicate that the needle has penetrated the pleura. This point is most important to bear in mind. As soon as the needle has penetrated the parietal pleura, there will be seen free fluctuations of the fluid in the manometer. Inasmuch as these free fluctuations constitute the sole assurance that the needle lies safely within the layers of the pleura, they must be definitely present before air is permitted to flow into the pleural sac. Such assurance is the only means known for avoiding the occurrence of air embolism and puncture of the lung, the two most formidable accidents of pneumothorax therapy.

The operator will notice that the fluctuations of the manometric fluid cause displacement upward in one limb and downward in the other. Most manometers to-day are calibrated in terms of centimeters. It is important to record the entire displacement of fluid; therefore if only one limb of the manometer is observed for its fluctuations, the displace-

ment on this side must be doubled to obtain the "true" intra-pleural pressure. Unless this is done universally, any discussion of intra-pleural pressures will require an explanation of the values obtained; i. e. whether the reading is for one limb or for the entire fluid displacement. Those not accustomed to using manometers will avoid confusion at first by reading the values on the limb of the manometer *not* attached to the needle inserted into the pleural cavity. On this limb, displacement of the fluid above the zero mark indicates positive pressures, while displacement below the zero mark indicates negative pressures.

It is advisable to record the pressures only on quiet respiration. After the needle has been securely inserted between the layers of the pleura, the heights of the columns on inspiration and on expiration should be determined. The air is then allowed to flow into the pleural cavity. It will be noticed that as air enters the pleural cavity, there will be a change of pressure because of pleural distension and pulmonary compression. If too much air is insufflated, these pressures will equal or exceed that of the atmosphere. When it is considered to-day that the tendency among pneumothorax workers is to induce a collapse of low-pressure levels, it becomes obvious that regulation of intra-pleural pressures by attention to manometry is most important.

At times, a free fluctuation of the fluid in the manometer cannot be obtained. If the characteristic snap has been appreciated, and the needle has been apparently passed through the parietal pleura, the absence of fluctuations should suggest three possibilities: The needle may be occluded (in which event the stylet should be used to cleanse it gently) or the tip of the needle may have passed through the visceral pleura into the parenchyme of the lung or there may be no free pleural space because of adhesive pleuritis. If fluctuations can be obtained after the needle has been shown to be in the pleural space, the needle should be withdrawn and inserted in another site. If the

given previously some air, it will be possible to aspirate some from the pleural sac; if the patient has never been treated by pneumothorax before this, there will obviously not be such assistance. Occasionally minor fluctuations, as from minus 2 cm. to plus 2 cm., will be obtained when the tip of the needle lies within the substance of the lung itself. It is not wise to permit passage of air into the chest unless the possibilities of adherent pleuritis and lung perforation have been eliminated. In either event, it is wiser to elect another site for pneumothorax. It should always be borne in mind that some patients have never any free pleural space and are therefore unsuited for pneumothorax at any time.

Once a definite pneumothorax has been established, and there are no complications, a given amount of air at regular intervals will produce about the same change in intra-pleural pressures. If a patient receives 500 cc. air once a week and his intra-pleural pressures vary from minus 10 to minus 3 cm. before air is insufflated and minus 2 cm. to 0 at the conclusion of the treatment, the same records should be obtained at each sitting. There will naturally be some slight variations from week to week, but if these variations are marked, the operator should think of the occurrence of complications. The intra-pleural pressure is a valuable guide on such occasions. If in such a patient as described above, the same starting pressure is obtained but only 300 cc. air suffice to bring the pressure to the level formerly reached after the insufflation of 500 cc. air, there is some encroachment on the pleural sac. Accumulation of fluid or the presence of adhesions are the most common causes. If fluid is present, it will be noted that before any air is injected, the pressure may be almost as high as it was at the completion of the last artificial pneumothorax. If after a small amount of air is injected, the pressure tends to rise abruptly, the needle is probably within a pocket formed by fluid. One is justified in suspecting the presence of fluid, if a patient is

able to maintain a fairly even degree of pulmonary collapse over a relatively long period of time without addition of air or if there is marked variation in fluctuations of the manometer with respiration. If the pressure is very high before air is permitted to enter the pleural sac, and there is obvious dyspnea, there is probably excessive mediastinal displacement because of a "high-tension" pneumothorax. Aspiration of air from the pleural sac is accompanied by relief of symptoms in such an event. If a patient has a spontaneous pneumothorax, the amount of air to be withdrawn at a time can be judged largely by the reduction in intra-pleural pressures achieved.

Bunta has properly compared the information afforded by the intelligent use of the manometer to that offered by the instrument panel of the aviator. The aviator is handicapped, but is not helpless, when he does not receive signals from the ground. In the same way, the pneumothorax operator prefers not to dispense with the use of the x-ray, but when this is not available he can conduct pulmonary collapse by noting the variations in the intra-pleural pressures and by interpreting them in light of the physiological principles applying to pneumothorax therapy.

### Summary

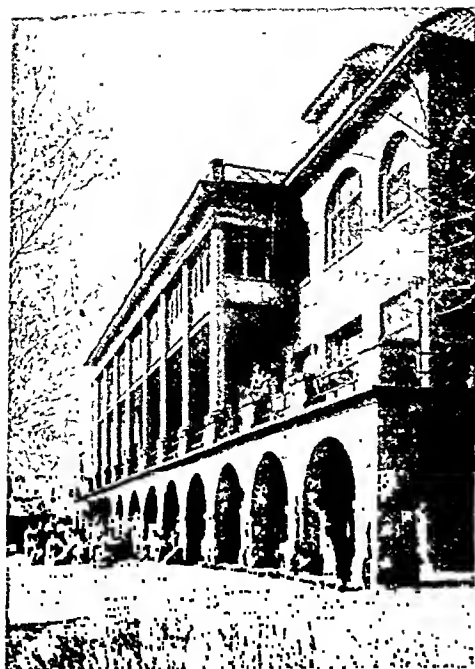
1. The use of the water manometer has made induction of pneumothorax much safer.

2. Without obtaining free manometer fluctuations, the operator is not certain that the tip of the needle lies in the pleural sac.

3. The normal intra-pleural pressure varies from minus 10 to minus 6 cm. on inspiration and minus 7 to minus 4 cm. on expiration.

4. As air enters the pleural sac, the intra-pleural pressure slowly increases. If this increase does not occur, the tip of the needle has perforated the visceral pleura.

(Continued to page 26)



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# Tobacco and Tuberculosis

## *Infection*

THE USE of tobacco is so wide spread, and so many conflicting statements regarding its effects on health and disease may be heard, that a brief review of the existing knowledge of the relationship of tobacco and tuberculosis may be of interest to physicians caring for consumptives. Although the possibility of the transmission of tubercle bacilli in "spit tipped" cigars has been demonstrated, this constitutes more of an aesthetic than a hygienic factor, as it is unlikely that actual clinical infection and disease has been often produced in this manner. The transmission of the germs from one mouth to another in passing the "peace pipe" or otherwise sharing smoking utensils, as well as in lighting cigarettes for one another by taking a puff, may more often be incriminated.

The general carelessness so apt to be associated with the use of tobacco, especially in such matters as coughing and expectorating without regard to the aesthetic or hygienic sensitivities of one's neighbors may be particularly dangerous if the tobacco user happens also to have an open pulmonary tuberculosis, as the germladen expectoration may be scattered freely and endanger the health of others. This is especially true of tobacco chewers, as raw tobacco has been proved to support viable tubercle bacilli for weeks, but may also be the case with smokers, since the possible disinfecting action of the smoke is so superficial and transient that it cannot be expected to have any effect on the dangerous bacilli in the sputum.

## *Tuberculosis in the Trade*

A high incidence of tuberculosis among workers in tobacco has been repeatedly reported, and some writers have attempted to show that the chronic irritation of tobacco dust may be a factor in lowering the resistance of the people employed. However, no such excess

BY

EMIL BOGEN, M.D.  
Olive View, California

of tuberculosis among tobacco workers has been found, and it appears probable that the conditions previously described were consequences of the crowded, dark, damp and dusty conditions under which the poorly paid employees, mainly cigar makers, were compelled to work in earlier years, rather than due to any specific effect of the tobacco itself. The fact that cigar making was for so long an occupation employing large numbers of persons on a piecework basis at sedentary work which could be readily learned and undertaken by individuals physically incapable of holding more strenuous manual jobs may account, moreover, for a tendency for individuals already tuberculous to drift into this vocation, and thus swell the apparent toll of the disease in this field.

With the introduction of machinery in tobacco manufacturing and the organization of the workers in this trade, conditions have changed from the sweat shops of a generation ago, and sanitary conditions among some of the newer cigarette factories have been described so enthusiastically that it is unlikely that the white plague will continue to spread in this industry. Out among the neglected districts of many a "Tobacco Road," the high incidence of tuberculosis similarly reflects the poverty and ignorance of the poor tobacco growers, rather than any dangers inherent in the occupation.

## *Lowered Resistance*

The effect of tobacco smoking on resistance to tuberculosis is difficult to evaluate. That certain dusts, more especially those containing silica, tend to lower the resistance of the body against previously arrested or later acquired tuberculosis has been generally observed. The dusts of vegetable origin, and particularly carbon dust, such as might be expected to be found in tobacco smoke, is more often considered to produce a relatively harmless anthracosis, which, although it may

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predispose to bronchitis and emphysema, affords, if anything, a slightly increased resistance against tuberculosis. The chronic inflammation of the upper respiratory tract that so often accompanies smoking might also be expected, a priori, to lower resistance to the implantation of the infection in these tissues, but there is no proof available that this is true, or even that the reverse may not be the case, instead. Several studies have revealed a lower vital capacity among smokers, as compared with abstainers, but the differences are small, and in at least one investigation the reverse was found to be true.

### *Deleterious Effects*

Although it may not be proved that smoking actually predisposes to infection of the lungs with tuberculosis, it seems that it may lead to more frequent localization of tuberculous involvement in the larynx. Not only do statistical investigations show a higher incidence of laryngeal lesions among the patients reporting that they use tobacco, but clinicians repeatedly report that patients recover from this complication more readily if they abstain from smoking. As similar improvement is reported following the "silence" or laryngeal rest treatment, it

seems plausible to charge the deleterious effects here noted to the irritative factors in the smoke.

The acceleration of the pulse rate, frequent extrasystoles and accentuated sinus arrhythmia, hacking cough and hoarseness, and loss of weight, which so often result from tobacco smoking, may simulate or accentuate the symptoms of tuberculosis, even to the extent of obscuring the true diagnosis, whether or not they exert much influence upon the actual course of the disease in the average case. Well controlled quantitative studies of the effect of tobacco on the course of pulmonary tuberculosis are lacking, but the judgment of phthisiologists is almost unanimous that it can do no good, and may do harm, although it is too often impossible to prevail upon the patient to abandon the habit, even when its dangers are recognized and emphasized.

It has been stated that the discipline and self control required to follow the cure successfully is strengthened by strict abstinence and that those who continue to smoke are less apt to follow the other minutiae of the cure to a successful conclusion. Fire hazards and other considerations often underlie the regulations against smoking in many institutions, but intelligent cooperation is needed for their enforcement.

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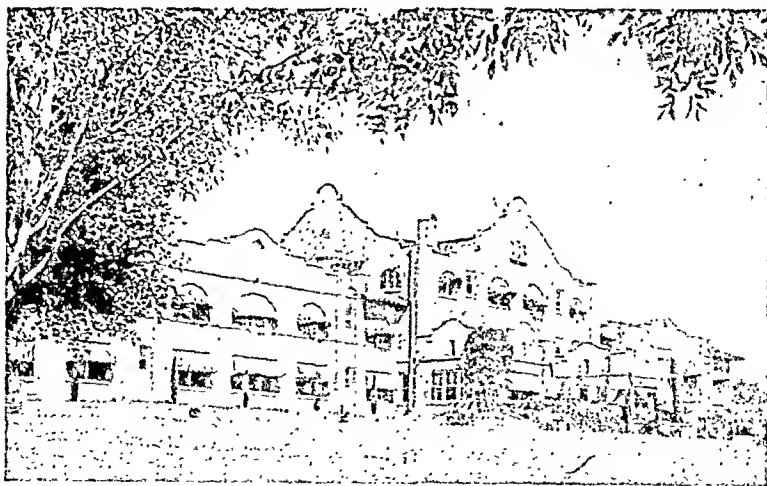
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skillfully done is practically a painless procedure and should always be done where fluid or pus is suspected. It has been my experience that the so-called unresolved pneumonia is in most instances due to the presence of pus and the exploratory needle will reveal it. The injection into the bronchial tree of iodized oil is being done a great deal today; and the information afforded by this method is of untold value. Many a case of lung abscess, bronchiectasis, and neoplasm have been revealed by its use. It is well to mention here that this procedure has considerable therapeutic virtue in many cases of bronchial disease. What has been said of the iodized oil injections can also be said of bronchoscopy. When confronted

with a puzzling or obscure chest condition or when dealing with a patient having profuse purulent expectoration, do not forget the bronchoscope.

In conclusion, may I emphasize again the importance and significance of the intra-cutaneous tuberculin or Mantoux test. A negative test in an adult is an extremely valuable aid in ruling out tuberculosis; and a positive test in the very young usually signifies the exposure to an open case of tuberculosis in the immediate environment. The tuberculin of choice is a purified protein derivative known as P. P. D. At the present time its cost is somewhat prohibitive; but let's hope that soon its universal use will standardize this valuable test the world over.

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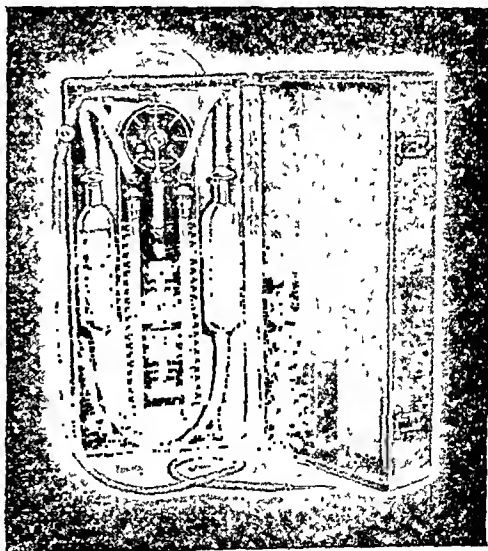
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|--------------------|-----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
| <b>TEMPERATURE</b> |     |     |     |     |     |      |      |     |      |     |     |     |
| Mean monthly       | 49  | 52  | 51  | 55  | 64  | 74   | 77   | 82  | 69   | 73  | 68  | 57  |
| 40-year average    | 49  | 52  | 51  | 55  | 64  | 74   | 77   | 82  | 69   | 73  | 68  | 57  |
| <b>RAINFALL</b>    |     |     |     |     |     |      |      |     |      |     |     |     |
| in inches          | 8   | 9   | 6   | 11  | 32  | 24   | 23   | 24  | 24   | 10  | 6   | 7   |
| 40-year average    | 8   | 9   | 6   | 11  | 32  | 24   | 23   | 24  | 24   | 10  | 6   | 7   |
| <b>HUMIDITY</b>    |     |     |     |     |     |      |      |     |      |     |     |     |
| Monthly            | 61  | 56  | 48  | 44  | 42  | 34   | 29   | 34  | 53   | 47  | 46  | 51  |
| 40-year average    | 61  | 56  | 48  | 44  | 42  | 34   | 29   | 34  | 53   | 47  | 46  | 51  |
| <b>WIND</b>        |     |     |     |     |     |      |      |     |      |     |     |     |
| Monthly            | 35  | 37  | 27  | 22  | 22  | 26   | 19   | 17  | 36   | 35  | 29  | 26  |
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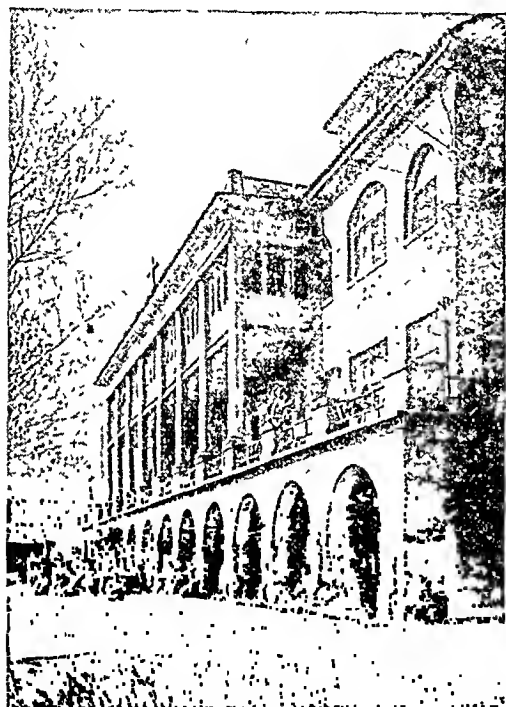
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# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

MYRTLE AND VIRGINIA STREETS

EL PASO, TEXAS

February 1, 1937.

Gentlemen:

This is the *fourteenth* in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

It is the purpose of the Committee on Economics of the Federation of American Sanatoria to bring to the attention of physicians and to those officials who see large groups of patients, the facilities which the private sanatoria of this country have to offer to the tuberculous.

The first sanatoria in this country were established through private initiative and by private funds. We have come a long way since then, but our experience has taught us that individual private care can best be obtained in a private sanatorium.

The pioneers in the fight against tuberculosis have been the physicians in the private practice of chest diseases. They have kept in step with the modern trends of diagnosis and treatment. They are today, the members of the Federation of American Sanatoria and you will find them listed in our recent Pneumothorax Directory.

For your convenience, we have listed below the private sanatoria affiliated with the Federation of American Sanatoria. They are the finest private sanatoria in the United States and they are well equipped to cater to the welfare of your patients. Elsewhere, throughout this journal, you will find individual listings of these sanatoria.

For further particulars address any of the sanatoria or write to the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,  
Federation of American Sanatoria.

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## CHEST

(A MONTHLY PUBLICATION)

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*"The most important factor in diagnosis in  
 the majority of cases of pulmonary tubercu-  
 losis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

**Public Health** DURING THE PAST two decades the program of Public Health has broadened considerably. The stress of hygienic effort has tended to shift from community to individual. This has been partly due to new methods of disease control made possible by advances in immunology. By this shift and emphasis the importance of the practitioner has been greatly increased. Immunology has now provided preventative inoculation against diphtheria and typhoid fever, as well as against small pox. The success of the campaign against tuberculosis by organized case finding, as well as prevention, has led to organized campaigns against cancer, heart disease, venereal diseases and mental illness. The drive against syphilis and other venereal diseases is being particularly emphasized at the present time by the Surgeon General of the United States Public Health Service.

There has been a shift in recent years of emphasis in practical medicine, from treatment to prevention. This shift must be recognized and accepted by the practitioner because he should hold the key to the situation. Just as the drive against tuberculosis, in many instances, took the situation out of the hands of the private physician because he was not alert to the changing aspect of things, medically, he should now hold himself in readiness to meet these new organized drives and hold first place by cooperating in every way

that will actually improve the public health.  
 C. M. H.

**Economics in Sanatorium Control** IT HAS ALWAYS been a puzzle to us why a municipality would expect other municipalities which have sanatoria to contract for their tuberculous citizens at a figure less than what it would cost them to build and maintain their own institution.

Why sanatoria now in operation should want to enter into such contracts has also been a puzzle to us; and yet there are many institutions which are accepting patients from other municipalities at less than the actual per diem cost of operation. Where these institutions are tax-supported, naturally the deficit is paid for by the tax-payers who maintain the institution. In the case of privately owned institutions, the patients who pay the regular fee must make up this deficit.

In figuring the per diem cost per patient, many institutions are wont to estimate only the cost of food and medical care. We wish to remind these institutions that such an estimate does not constitute the complete cost of operation since the cost of buildings, equipment, depreciation, replacements, and insurance are not taken into consideration. These, as well as a fair return on the capital invested, must be included in any comprehensive estimate of the per diem cost of operation for any institution.

Although this would increase the costs to the municipalities who do not have their own sanatoria and who desire to contract for the care of their tuberculous citizens, it would still be less expensive than the cost of building and maintaining new institutions.

The State of Colorado, at the last election, voted to establish a fund for the hospitalization of its tuberculous citizens in existing sanatoria throughout the state. This seems to us to be good common sense.

As a possible remedy for some of these conditions, we believe that a national conference, with adequate representation from every sanatorium, should be called. At this conference, plans should be formulated which would effect a working basis, fair to each of the institutions concerned.

Recent surveys show that some states have a long list of patients waiting for admittance to sanatoria while other states have vacant beds. Why can't some plan be worked out, through a federal registration bureau, so that every available bed will be utilized in our fight against tuberculosis?

A conference as suggested above, could lay the groundwork for the establishing of such a bureau.

Instead of state competing against state and county competing against county for the building of beds and more beds; let us have more intelligent cooperation and let us make full use of the present facilities in a concerted fight against tuberculosis.

M. K.

**Asthma** AS A CAUSE of death bronchial asthma is not particularly significant; as a cause of serious illness and invalidism it is an extremely important disease. It has been estimated by Soud that approximately three and one-half per cent of all persons in the United States suffer from hay fever or asthma. Others have placed this figure at five per cent. Often the patient has hay fever during early adulthood and asthma in late middle life. It is said that there are more

than half a million cases of asthma constantly in this country.

It is believed that asthma results from the interplay of two factors—one an inherited tendency (diathesis), the other an acquired reaction to some specific allergen or allergens. Concerning the inherited factor we can do nothing for the individual patient. Concerning the acquired factors—hypersensitivity to specific allergens—we may be able to do two things. By appropriate tests—intra-dermal tests, scratch tests, elimination diets, etc.—we can determine what substances are causing the patient's asthma. If we can then separate the patient from these substances he will have no more asthma. Failing to do this—and often such separation is an impossibility—we must proceed along other lines.

It is often possible to desensitize the patient to the chief offending substances causing his asthma. This is done by giving—by mouth, by injection, or by other means—minute doses of the allergen—so minute that they cause no outwardly discernable reaction. Gradually such doses are increased until at last the patient can tolerate the amounts of this specific substance which he meets in his usual daily routine. Such desensitization treatment is fairly effective and should be tried in all cases. In the interim between onset of asthma and the time of complete desensitization the patient may have many attacks of asthma. For these he will be in urgent need of symptomatic relief. Inability to draw into the lungs the necessary amount of air gives the patient a terrible fear of suffocation, causing insomnia, nervousness, and often leading to a definite neurosis with loss of economic independence. For these reasons effective symptomatic treatment assumes a position of great importance in the handling of asthmatic patients.

A recent addition to the various methods of symptomatic treatment has been the inhalation of adrenalin chloride in 1-100 solution as advocated by Graeser and Rowe.

**A Warning!** IN THE SURGE of our enthusiasm for collapse therapy, there has arisen what I feel is a decided need for proclaiming a warning. In no sense do I mean that we have created a Frankenstein that threatens to boomerang destructively against us. Collapse therapy is the order of the day. It has revolutionized the care, treatment and rehabilitation of the tuberculous sick; and is lifting the curtain of despair to permit the rays of hope and courage to beam from a more distant horizon. It should be administered however by only those who have familiarized themselves with it. Therein lies this caution. It is not for the inexperienced tyro. The indiscriminate and unskilled plunging of needles into the thoracic cavity is fraught with danger, and likewise tends to discredit this most laudible procedure of collapsing the lung — Pneumothorax. The performance of the simple operation on the phrenic nerve, calls for a skilled technique and a profound knowledge of the anatomy of the vital structures exposed in a resection of the neck. The training in collapse therapy is readily available, and let it again be urged that only those who are competent, engage in it.

C. H. H.

**Health Insurance** UNDOUBTEDLY within the next few months the question of Health Insurance will come up as an added provision of the Social Security Act.

Recently, a letter by the President of a leading state medical society, has come to our attention. This letter, in our opinion, approaches the subject in an ideal manner. The letter was addressed to The Social Security Board. The letter is as follows:

"The medical profession of (Blank) has read with considerable interest the announcement that a study of health insurance is to be carried out by your board. We desire to cooperate with you in any survey that you make, and believe we can assist effectively.

"We are ever mindful of our responsibility to provide our people with the best

possible medical service at reasonable cost. To that end, you will find us receptive to new methods for service distribution, provided they adhere to the basic tenets of better medical care.

"In a general way, the profession is opposed to health insurance for the reason that it believes such measures result in a system of inferior medical service at no saving in cost, and place physicians under the supervision and control of a lay bureaucracy, as has been done repeatedly in those countries where it has been introduced.

"Physicians are quite willing to admit, however, that there is real need for a better distribution of medical service to the low-wage earner and to the indigent. This group is no longer a small by-product of society which can be cared for gratis by the medical profession. At times, demands of these groups for free medical service reach the proportions of a Frankenstein. We do not wish to be obstructive in any movement which provides serious consideration of the public welfare, and you will find us more than willing, to assist in a carefully-planned study of ways and means to deliver better medical care.

"In the health provisions of the present Social Security law, our medical society has cooperated wholeheartedly. We believe that our program for public health, maternal welfare, child health, crippled children, and venereal disease is at least on a par with that of any other state, and in this program the medical men of (Blank) are taking a most active part.

"We offer our assistance in conducting a study of health insurance needs and their application in (Blank) and can assure you that we are organized to take an active and effective part. We are ready to experiment in specific projects or plans which you might propose.

"Finally, we respectfully urge your board not to endorse any plan for health insurance without careful study in which the medical profession will be given a full opportunity to participate, criticize constructively, and evaluate." C. M. H.

# More About the Endocrines, in the Active Treatment Of Pulmonary Tuberculosis \* PART II.

MY HYPOTHESIS on the active treatment of pulmonary tuberculosis with endocrines needs further explanation and I propose to attempt this by using anatomical and biochemical reasoning.

In reviewing the medical literature on tuberculosis one is finally impressed with the looseness and ambiguity of the terms *constitutional pre-disposition*, *resistance*, *relative immunity* and *immunity*, when in all probability there is no real existence of specific immunity *per se*. If the functions of the endocrines are the factors in the determination of predisposition or resistance to active tuberculosis, I might suggest that for the sake of convenience and uniformity we speak of "vital resistance" of the individual, which is necessarily relative in degree.

We can only hope for inactivity and the arrest of the disease, either spontaneously or through active medical or surgical treatment, and not for a positive cure.

In connection with this theory I made mention of the controlling powers of the endocrines over the lymphatic system and will later refer to their controlling influence over the enzymes. Tuberculous lymphadenopathy known by the ancient name of scrofula bears a relationship to tuberculosis in later life according to recent information. Since the lymphatics do sentinel duty for the body, and since the endocrines are so important in body economy and metabolism, a controlling influence of the latter over the former must exist if infections are to be dealt with satisfactorily.

Bartel and Eschrich have shown that scrofula is a form of infantile tuberculosis which occurs only in subjects possess-

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ing the lymphatic diathesis. If such is the case, there is one thing certain—that scrofulous children rarely develop pulmonary tuberculosis in later life and when a lung lesion does occur it runs a very mild course and tends to cicatrization, a fact which was already observed by clinicians several generations ago.

We must also remember that other children who do not present characteristics of the lymphatic constitution are also able to resist this disease, thus explaining a difference of degree in "vital resistance," if we assume that the approximate number and degree of virulence of the micro-organisms causing the infections are the same.

A comprehensive understanding of the migration or movements in vivo of the tubercle bacillus should be gleaned from the following: Whether the micro-organism gains entrance by way of the nose, throat and mouth, bronchi, or intestinal tract, it is "picked up" by the lymphatics and deposited in the regional lymph-nodes. This function is essential to human existence.

Studies carried out in Dr. Allen K. Krause's laboratories in Baltimore have shown the presence in the walls of the larger bronchi of small nests or pockets of lymphatic tissue, covered only by a thin layer of bronchial mucosa. Krause believes that these islands of lymphatic tissue drain the bronchial mucosa; that tubercle bacilli which invade them are carried thence through lymphatic channels into the thoracic duct which, in turn, conveys them to the venous blood stream in the neck, whence they ultimately find lodgement in the pulmonary tissue by way of the pulmonary artery. It is quite conceivable that pyogenic organisms also find their way into these islands of lymphatic tissue, whence they, too, may reach the lung by way of the pulmonary artery.

These small islands of lymphatic tissue

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may also be invaded by a more virulent organism which destroys the lymphatic tissue and the contiguous pulmonary tissue, resulting in suppuration and destruction.

The destruction of these pockets of lymphatic tissue by a bronchogenic spread or extension of the infection could well result in multiple saccular dilatations of the bronchi or in honeycombed cavitations.

I agree with the above in part but am satisfied that nature did not intend such an easy surrender to so formidable a foe as the tubercle bacillus. My belief is that the virus under the circumstances of ordinary infection penetrate the mucosa of the larger bronchi, are retarded in the submucosal islands or nests, and from there are carried through lymphatic channels into the regional lymph glands known as tracheo-bronchial lymph nodes—situated in the chest.

The manifestations of scrofula, active tracheo-bronchial lymphadenopathy or mesenteric tuberculous lymphadenoma, would indicate a local fight on the part of these glands as a result of some degree of virulence of the micro-organism or some degree of impairment of the endocrine balance, or both. These micro-organisms are carried to the lymphatic glands by afferent vessels; they might escape the first line of defense, and then be carried out into the efferent lymphatic vessels into the next gland, and this undoubtedly explains why several of the glands are involved. They may be so small as to be hardly palpable, but in others they become visible, and in extreme cases, two chains of enlarged glands are seen on both sides of the neck adherent to one another and to the skin.

Now an important factor to my mind is the next step—the invasion of the body by the micro-organism. While these are retained by the lymphatic glands in active disease, a bitter struggle ensues, but some of the micro-organisms are “spilled” into the venous blood and are carried by means of veins to the right side of the heart and thence to the lungs by means

of the pulmonary artery. This phenomenon does not necessarily indicate collapse of “vital resistance.” The lymphatic glands are supplied with arteries and veins as all tissues of the body are. Even though the proximal lymphatic channels, or terminal efferent lymphatic vessels, would pick the tubercle bacilli up, they would still be conveyed to the right side of the heart and thence to the lung parenchyma by way of the pulmonary artery.

This phase of advancement of the bacilli from the lymphatic vessels to the lung by way of the pulmonary artery is either misconstrued or misrepresented in most data on this subject. The Ghon spoken of so often is described as the primary focus, but in reality is one of the foci in the secondary stage. It becomes necessary to digress a little at this point to explain further this dissemination in the body of the tubercle bacilli. The pulmonary artery carries impure blood through the lungs for oxidation (giving off  $\text{CO}_2$  and taking up O) and expelling any innocuous micro-organisms that happen to be present at that time. Therefore, to serve this physiological and protective purpose, the terminal branches of this vessel must consist merely of a very thin, delicate, and permeable wall or membrane. Periarterial lymphoid aggregations occur but they may be scarcer around arteries in which the blood current is swifter than around the veins, in which the current is considerably retarded. It is at this point in the arterial bed of the lung that implantation of the tubercle bacilli takes place, and the lesion is a tubercle or Ghon, involving one or more lobules. Here again if germs should escape and not enter the terminal bronchioles, alveolar passages, or alveoli, they would be engulfed by the lymphatic vessels and brought to the regional lymph glands rather than be allowed to escape into the lung parenchyma. This lymphoid tissue surrounding the veins may be more ample because foreign and irritating materials that enter the alveoli through the inspiratory act, must be acted upon and removed if they escape from the veins. Some of the micro-organ-

isms may circulate through the pulmonary veins directly from the pulmonary artery to the left side of the heart, thus completing their travel through the lesser circulation, thence through the aorta and its branches, precipitating hematogenous metastases in the bones, joints, kidneys, etc., via the greater circulation. The Ghon is, therefore, one of the secondary lesions, as it will be designated in this article, and it tends to disappear spontaneously and completely, or to become calcified as do the lymphatic glands, because the "vital resistance" is high because of a satisfactory function of the endocrine glands which prevent the inroads of the virus or stimulate repair when damage is done.

It is stated that the bacilli are not walled off as securely in the Ghon as was formerly thought. By absorption of the calcium and magnesium barriers, the bacilli may again become reactivated locally, or transported to the right side of the heart through the lymphatics or veins that drain the lymphatic glands to the lung tissue, establishing in either case active pulmonary tuberculosis. This represents the phase of isolated organ tuberculosis, so often referred to as the tertiary stage. Here is where the first really serious break in the designated "vital resistive forces" of the human organism takes place, and the tubercle bacilli assume the ascendancy.

The following is the crux of the situation producing the lung lesion or lesions known as active pulmonary tuberculosis. According to Aschoff, the terminal bronchioles divide into respiratory bronchioles, under which term are understood those bronchioles which are lined by ciliated or cubical epithelium on the side on which the artery lies while alveoli are present on the other side. The respiratory bronchioles subdivide into similar respiratory bronchioles of the second and third order. Each respiratory bronchiole of the third order divides dichotomously into two alveolar passages, which contain muscle in their walls. The alveoli passages each divide dichotomously into two further orders of alveolar passages and

these finally terminate in the alveolar sacs, which are devoid of muscle; moreover, active phthisis does not begin as a catarrh of the small bronchi, as some believe, but as an infiltration, a caseous bronchopneumonic process involving one or more lobules of the parenchyma, transforming the normal porous air-containing and resonant lung into solid non-resonant tissue. At this state the alveoli are filled with exudate, or the interstitial tissues contract and compress the alveoli, finally obliterating them altogether. So long as the infiltration remains beneath the mucous membrane of the bronchi, the entrance of air into the alveoli of the affected area is not interfered with very much, while in the rest of the lung it is freely circulating.

It is only when the caseous material of the infiltrate softens and breaks through the wall of the bronchus, thus permitting the entrance of air into the diseased focus proper, that rales can be heard on auscultation. At that time tubercle bacilli make their appearance in the sputum. When we hear rales we may be sure that we are dealing with a more or less advanced stage of the disease—caseation and softening already having taken place. Many vaunted schemes and so-called sovereign remedies of the past and present have ignored the traditional therapeutic triad in the management of the disease. Rest, fresh air, and good food on the contrary become an essential part of this treatment as will be shown later on. This is what Fishberg has to say in his textbook on pulmonary tuberculosis, Volume I, page 126: "In the search for the factors predisposing to phthisis many have looked into the metabolism of the body stating that tuberculous infection is harmless in the vast majority of persons, so long as the metabolic processes are normal; only when certain disturbances occur in this regard can phthisis develop. It is, however, a fact that in the enormous literature on the subject of tuberculosis, we cannot find an exhaustive study of the metabolism of persons affected with the disease, and hardly any-

thing about the metabolism in the so-called pre-tuberculous stage."

Immunity attempts have been carried out along the following lines:

1. By injecting virulent tubercle bacilli.
2. By injecting avirulent or attenuated tubercle bacilli.
3. By injecting dead bacilli.

Administering the latter will probably do no harm and certainly no good, but injecting virulent or avirulent tubercle bacilli or introducing them into the human body by any method is not only ineffective in producing immunity, but extremely dangerous. We are waging a fight to prevent infections and the above methods (Numbers 1 and 2) would be producing infections instead of encouraging the desired immunity. Healing in tuberculosis must come from two separate processes: fibrosis and calcification—fibrosis from the fixed tissue cells and calcification by chemical reaction and deposition of lime and magnesium salts. A third method of healing, but little recognized until recently, is that of absorption, somewhat analagous to the resolution seen in pneumonia.

The ductless glands preside over these functions through enzymic action. These enzymes are scattered throughout the body and are probably specific; and whether they are insufficiently produced or relatively weak because the necessary stimulating influence of the endocrines are lacking, their administration to active tuberculous patients is encouraged, either in combination or as a single gland product, if unquestionable experimental and clinical data will establish their actual worth. There is no depletion of calcium in the blood plasma in tuberculosis; the difficulty comes from lack of its utilization.

#### *Conclusions:*

1. I am in complete agreement with Krause who states that in the submucosa of the larger bronchi, small nests or pockets of lymphatic tissue exist which are protective in nature, and I believe

that the tubercle bacillus penetrates the mucosa of the larger bronchi. This point of penetration and the involvement of the appertaining tracheo-bronchial lymph-nodes constitutes the "primary complex."

2. A secondary stage, with hematogenous metastases, of which the Ghon is an integral part.

3. A tertiary stage, with isolated organ tuberculosis.

4. The lymphatic system is the first line of body defense after the skin or mucosa has been penetrated; the lungs are lavishly supplied with lymphatics superficial and deep networks which intercommunicate. Lymphoid aggregations occur throughout the lung in the sites of the subpleural, peribronchial, periarterial, and perivenous systems.

5. If we recognize the fact that the mucous membranes of the mouth, nose and throat, or intestinal tract act as portals of entry of the tubercle bacillus, the assumption that the Ghon is the primary lesion is incorrect, because the micro-organisms under these circumstances will be carried to the cervical or mesenteric lymph glands first, and this invasion constitutes the primary focus of infection.

6. When infection takes place with tubercle bacilli, the resistive powers of the organism will be determined by the inherent qualities of the ductless glands. These shades of difference in the strength of the endocrines probably explain the reasons for various stages of the disease, and when the endocrines are seriously impaired, the body loses control of the situation until active pulmonary tuberculosis becomes an actuality.

7. The theory of the dysfunction of the endocrines as a causative factor in pulmonary tuberculosis is not only plausible, but rationally sound, but this announcement should not be hailed by an enthusiastic medical profession or laity feverishly waiting for some remedy that is universally applicable in tuberculosis; on the contrary its soundness and worth must be appraised through research and experimentation and finally clinical application.

## What are we waiting for?

If we will only put the idea of immunity in tuberculosis aside and attack the problem along a different front, namely, endocrinology and endocrine therapy, I have no doubt that our efforts will be ultimately crowned with success so that the dark path of tuberculous disease may be brightly illuminated by the flares of medical accomplishment and progress.

The following is the chemical contribution to the theory of endocrine therapy in active tuberculosis. It is offered by Mr. Samuel A. Owen, of Albuquerque, New Mexico. Mr. Owen is a registered pharmacist and laboratory technician (Bacteriology) and is connected with the U. S. Veterans Administration Facility there:

Cystine appears to be an amino acid which should be regarded with consideration in the breaking down and building up of diseased tissue and in particular with regard to tuberculosis. Cystine is one of the four known amino acids which cannot be synthesized in the body, lysine, tryptophane and tyrosine being the other three. It is also questionable as to whether histidine and proline can be synthesized.

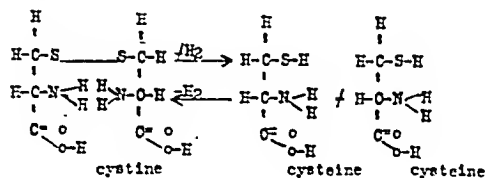
This being the case, it is apparent that cystine must be amply present in the diet if the patient is to be properly nourished. It is also generally recognized that cystine plays an important role as a detoxitizing agent in the body.

Cystine and cysteine are the only sulphur-containing bodies resulting from the hydrolysis of simple protein.

Cystine dissolves readily in mineral acid and alkalis, but is insoluble in acetic acid.

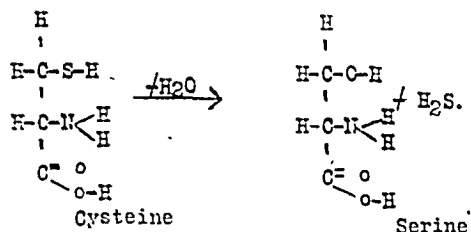
Upon reduction, cystine is converted into two molecules of cysteine, which, however, in the air or in alkaline solution readily oxidize to cystine.

This would indicate this acid has a



profound influence in the oxidation and reduction reactions carried on in the cell metabolism.

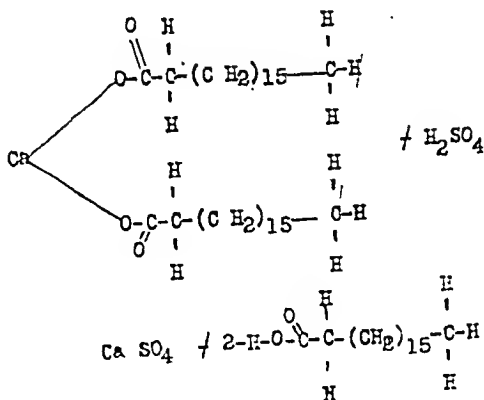
Lusk believes that all six carbon atoms of cystine may enter into the formation of sugar in the diabetic organism. This probably happens through the early conversion of cystine into cysteine, and then perhaps into serine:



If this reaction actually occurs, it would appear that mild doses of insulin might be beneficial in tantommarizing this formed sugar into glycogen.

If, however, this is not taken care of it may be probable that iodine contained in the thyroxin may be utilized by nature's process to relieve the congestion; if this reaction occurs it may possibly be that the carbon chain residues may be synthesized into complex chains and tend to develop alcohols of the high series comparable to waxes.

The  $\text{H}_2\text{S}$  is then oxidized to sulphate and it is possible that this substance reacts with the caseous material which is an emulsion similar to a soap, in this case a calcium soap.



It may also be possible that condensation of these fatty acids may produce the  
(Continued to page 30) .

# Standardization of Tuberculosis Case Finding Procedure in Schools\*

THE PURPOSE of this discussion is to formulate, as far as feasible, a uniform method of procedure and to establish such minimal standards in our efforts to uncover tuberculosis in the public school system, as will be productive of best results with a minimal expenditure of effort, time, and money. All of this should be in harmony with present-day knowledge and our aim should be pragmatic rather than academic. As now practiced, the tuberculosis case-finding program in the public schools is a haphazard affair. Much interest has been aroused in the public mind concerning the tuberculin test and x-ray examination of the chest in school children; but no clear cut idea prevails as to their significance, what ultimate results may be expected, or how to obtain them.

## *The Approach.*

Everyone will agree that a preliminary educational campaign is an essential part of the program. Mr. Whealdon, on a previous occasion, related to us how to make spinach palatable—a very useful and practical thing; however, palatability must not be permitted to supersede a clearly defined and properly evaluated utility. In common parlance, there should be less “ballyhoo,” less exaggeration of benefits to be derived and less vagueness regarding procedures or costs involved. There should also be less high-pressure salesmanship and more plain, understandable language. We must insist that to be of real benefit, the tuberculosis case-finding process must be a continuous yearly affair, conducted only by competent personnel and for economy's sake limited to definite age groups, including, of course, teachers and nurses.

BY

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## *The Objective.*

It will be taken for granted that the first and main object in subjecting large groups of people to the tuberculin test and x-ray examination of the chest is to find open tuberculosis in its communicable stage so as to shut off at their sources the fountains of infection; the second object is to find some cases in the minimal stage so that they may be more readily cured and thus prevented from becoming hopelessly advanced. The third object is to find the borderline cases so that they may be warned of impending danger and given proper advice. The fourth object is to prevent the reactor from contributing to familial or other sources of infection.

## *Groups to be subjected to these Examinations.*

First, school personnel of all grades who are in close contact with the children, namely teachers and nurses. What benefit can be derived from finding hundreds or thousands of cases of primary “childhood type” tuberculosis which is non-infective in character, and then allow these to be repeatedly re-infected by some teacher or school nurse with undiscovered open tuberculosis? Harrington, Meyers and Levine report as follows: “Ickert found 93.5 per cent of children reacting positively when exposed to tuberculous teachers against 25 per cent when not so exposed. Klein found 72 per cent reactors among such children when exposed, while Frost found 71 per cent reacting positively, against 11.4 per cent when not so exposed.”

In Minnesota, out of 2466 members of the school personnel examined, 78 were found with parenchymal lesions; 3 of these were far advanced, 4 moderately advanced, and 61 minimal. Minnesota is known to have a low incidence of tuberculosis

\*Read at the Annual Conference of the New Jersey Tuberculosis League, Trenton, October 1935.

Our emphasis must therefore be on the finding of the open adult type of tuberculosis. Some appropriate legislation along these lines seems highly desirable. Children under fifteen rarely have serious clinical pulmonary tuberculosis excepting in infancy. Because of economic and practical considerations we should limit ourselves to the age groups around fifteen and over. Dr. Jay A. Myers has clearly shown the impracticability of the procedure in the lower age groups and has wisely acted upon his findings which cover an extended period at the Lymanhurst school in Minnesota by discontinuing the practice of x-raying children below the age of 12 years.

#### *The Tuberculin Test.*

It is a far cry from the scratch technique of Von Pirquet with old tuberculin (O.T.) and the various other tuberculin tests that have been evolved since then, to that of the intradermal method of Mantoux with purified protein derivative (P.P.D.). There is, however, no agreement in technique, dosage, or number of tests applied in these surveys. Some workers still cling to the original Von Pirquet test although the Mantoux, because of its greater accuracy, is deservedly gaining in popularity and is therefore used most frequently. The dilutions of O.T. used vary according to individual preference from 1 to 100,000 to 1 to 100, and even 1 to 10; but the accepted quantity actually injected is quite uniform, i.e., 1/10 c.c. for those over the age of 5 years and .005 c.c. below that age. The number of injections depend on the initial dilution used. Previously it was routine to begin with 1/100,000 or 1/10,000 so as to avoid severe reactions. This was followed by 1/1,000 and finally by 1/100, making three injections in all. The experiences of many workers in many different places taught us that in mass testing, a dilution of 1/1000 O.T. or its equivalent of P.P.D. will result in approximately 95 per cent of all possible reactions without producing extremely severe ones and this has

been the trend followed lately by most workers. While we cannot subscribe to the general impression gained from some authorities that the 5 per cent reactors to the stronger solution of 1/100 thus missed are of no diagnostic importance anyway, we do believe that as a screening process a 95 per cent efficiency is quite satisfactory; remembering that some of the reactions will be fairly severe though not disabling. In our private and clinic work, however, we should insist on a second test when the first proves negative, beginning with a higher dilution followed with a 1/100 dilution.

O.T. is in itself a product of variable potency which cannot be accurately standardized and P.P.D. is the only alternative as a standard product. The reason for P.P.D. not coming into general use is, of course, its high cost—80 injections for \$2.00—whereas O. T. yields 10000 injections for the same amount. Considering the financial difficulties involved in such projects, we might have to content ourselves with a 1/1000 O.T. altho the P.P.D. is far more desirable as a standard diagnostic material. We would suggest to the manufacturers, in order to reduce costs of P.P.D., that they should make available separately the first and second strengths as well as the buffered diluent. Those who have facilities, may prefer to prepare their own diluent. If the diluent were marketed separately, the second strength could be used in place of the first strength by diluting with 10 times the amount indicated. In individual cases this scheme will prove even more advantageous since not all first tests need to be repeated by any manner of means. Finally, if P.P.D. is to come into general usage for private practice, a package for single injection at a nominal cost must be devised.

#### *The X-ray of the Chest.*

We have heard much controversy regarding the relative value of the celluloid film, paper film, and fluoroscope as a diagnostic procedure. All other factors

being equal, there can be little question as to the superiority of the celluloid film in fineness of detail, over the other two methods. This being a case-finding undertaking in mass, the question of economy again enters largely into the picture and that method which offers the best results for the amount of money available should be the one chosen. Here we wish to stress the point that it is of far greater importance to make sure of the competence of those who interpret the findings than the choice of a particular film. Frankly, we would by far prefer the fluoroscope in competent hands, though it is the least reliable of the three procedures and involves taking a chance of missing not over 5 per cent of insignificant lesions, to the best film obtainable in the hands of an incompetent diagnostician.

Considering the importance of a correct interpretation of the findings, it would be equally desirable to agree on a uniform terminology. Whether we like it or not, the case finding program will be best served, until a better one is evolved, by following the classification outlined in the Diagnostic Standards of the National Tuberculosis Association, 9th Edition, 1931. It is not within the scope of this discussion to enter into a detailed analysis of this classification. It is germane, however, to point out that Childhood-Type of Tuberculosis as defined in the National Diagnostic Standards is recognized on x-ray films chiefly, though not wholly, because of the calcium deposition which takes place in the primary lesion in the course of its healing process. Unless these cases show some clinical manifestations of active disease, there is no reason for singling them out for special care. All reactors have a focus of tuberculosis somewhere in the body whether we can visualize it on the x-ray film or not, and all of the reactors will bear following up as to source of infection and as to need of admonitory advice, regular hours of rest, fresh air, and proper nutrition. Only those showing clinical activity will require special attention. All of this can be readily carried out at home. Insti-

tutional care should be reserved for those with frank adult type lesions or open tuberculosis only, which are exceedingly rare in children of primary school age.

### *The Sponsorship.*

The scene of action as well as the subjects of our study being the school, school personnel, and school children, it seems right and proper that the school authorities should be the sponsors for the tuberculosis case-finding program, stimulated and guided by the Tuberculosis League, the Tuberculosis Division of Boards of Health, or the sanatorium. These sponsors must be backed by the authority of the schools and must assume the responsibility of informing the parents or guardians of the results and the necessary after care. All cases requiring medical attention should be referred to the family physician, or, when indigent, to the clinic.

### *The Examining Physician.*

Unless the examiner is well qualified and thoroughly experienced not only in x-ray technique and interpretation but in all the phases of the tuberculosis problem, the entire project falls flat and is worse than useless. Much harm can be done by inexperience or lack of judgment. If we bear that in mind we shall have but little difficulty in choosing the right examiner. It should be wholly unnecessary to mention that the examiner is entitled to a reasonable compensation. The idea, however, is still prevalent that the doctor should donate his services for such a good cause.

### *Summation.*

It is quite evident from the preceding considerations that it is not at all an easy matter to formulate a plan for uniformity of procedure or a standardized technique in the tuberculosis case-finding process. Some facts stand out clear enough to be readily acceptable, while others may require further elaboration and experience. The following suggestions should there-

(Continued to page 26)

# The Collapse Program in Pulmonary Tuberculosis

THE DEVELOPMENT of collapse therapy in the treatment of pulmonary tuberculosis has been a gradual evolution through the past quarter of a century. Pneumothorax, which was the first attempt at collapse, was used and popularized largely by internists. Gradually the subject of collapse attracted the attention of more daring souls, the surgeons, and they together with the internist and physiologist further developed the subject until today we have many proven collapse procedures for the treatment of this disease. These procedures are referred to here as collapse measures. The individual, combined, and successive use of these measures represent what we are pleased to call the collapse program. With the use of these surgical measures in the treatment of pulmonary tuberculosis, the classification of this disease has been completely changed, in the minds of many physicians, from a medical to a surgical disease.

During this evolutionary period, not only has there been development of new procedures but much change of thought in the minds of doctors and lay people has taken place. This change of thought has been so great that the one time glorious phthisiologist has now lost cast to the point that he is almost antiquated, unless he has been the unusual fellow who was aggressive and has kept up with the procession of rather rapid changes.

Notwithstanding the fact that much progress has been made in the use of collapse therapy in this disease, there is still much to be accomplished; especially is there great need for further change in the minds of the medical profession, particularly those who devote themselves to the treatment of pulmonary tuberculosis. All too many of these are still thinking in terms of chronicity and sufficient advancement of the disease process to

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justify collapse. Many men who are real enthusiasts in the use of collapse measures in chronic cases seem not to have gotten far enough in their thinking to quite realize that no other disease is permitted to continue its ravages until far advanced before effective measures are used. Before collapse therapy reaches its greatest usefulness, this hurdle between the treatment of acute and chronic tuberculosis has got to be made by all, as it has been made by a few pioneers in this field.

The proper use of minor or revocable procedures in early cases of pulmonary tuberculosis has been proved, in our hands as well as in the hands of others, to be able to effect an arrest and often a rapid cure in a large percent of cases, thus avoiding a long siege of morbidity, if not a mortality, as is so frequently the case where cavernous and purulent lesions are permitted to develop before collapse is instituted. We can see nothing rational in waiting until wide-spread and cavernous lesions appear with their complications of adhesions and pyogenic infections. Such complications at once make almost certain bronchiectatic and atelectatic complications as well as certain sepsis, with its further disabling effects. The development of these mechanical factors makes collapse more difficult and hazardous in that they often require major collapse procedures to be effective; furthermore, while collapse may be obtained in such cases by the major procedures, in many the previous development of bronchiectatic dilatation and sepsis cause continued morbidity and prevent complete economic restoration. The intelligent application of surgical measures in the earliest possible stages of practically all cases of this disease would soon render almost obsolete the operation of thoracoplasty, extra-pleural

pneumonolysis and all such procedures as are indicated in far advanced cases. In other words the need for thoracoplasty in any individual case is positive evidence of mistakes of the past.

The treatment of tuberculosis is no longer a one-man job. It requires the combined judgment of a well-rounded staff consisting of at least one or two internists, a surgical staff trained in the use of all collapse measures, an otorhinolaryngologist, and a gastro-enterologist. Radiological and clinical laboratories are also essential. One sanatorium of 100-bed capacity, of which we have charge, has such a staff and we carry from 80 to 90 percent of all cases under some form of collapse therapy at all times. The only patients in this institution who are not under collapse are the new arrivals and those who are considered entirely hopeless.

The surgical treatment of pulmonary tuberculosis is the greatest advance in the treatment of this disease since the sanatorium or bed rest regime was established almost fifty years ago. From our viewpoint, pulmonary tuberculosis is a surgical disease from the time the diagnosis is made. Patients with this disease are as much entitled to surgery as patients with acute appendicitis. It is no longer a question of radical or conservative surgery but a question of rational treatment, and the earlier collapse is applied the better.

There are ten different proven procedures for use in the collapse treatment of pulmonary tuberculosis:

1. Sanatorium Regime.
2. Pneumothorax.
3. Phrenic Interruption,
  - a. Temporary,
  - b. Permanent.
4. Oleothorax.
5. Scalenotomy.
6. Bronchoscopy.
7. Internal Pneumonolysis,
  - a. Open,
  - b. Closed—Jacobeus.
8. Extrapleural Pneumonolysis—Plumbage.

9. Multiple Intercostal Nerveotomy,
  - a. Temporary.
  - b. Permanent.
10. Thoracoplasty,
  - a. Partial,
  - b. Complete.

The collapse or surgical program in pulmonary tuberculosis contemplates the use of these different procedures in suitable cases according to the pathology present and the condition of the patient. They are used singly, in combination, and successively. Treatment is started in each individual case whether early or late with one idea in view, i.e., arresting the diseased process at the earliest possible moment to render the patient sputum and bacilli-free and to return him to economic efficiency. Judgment dictates that preference be given to the controllable procedure when there is a reasonable hope of cure, which is always the case in early, limited invasions whether unilateral or bilateral.

Judgment and experience also dictate that there should be no time wasted after the initiation of any one procedure when it fails to produce results readily. Any procedure failing to produce prompt results should be supplemented with some other procedure or withdrawn at once, and a different procedure instituted which offers greater hope of being effective. Much valuable time is often wasted and many lives sacrificed by depending on some one ineffective or partially effective measure when some completely effective measure is available and suitable. Contrary to the old teaching on this subject, "Time is really the essence of success in the treatment of this disease." The application of these ideas illustrate the need for constant and intelligent team work in each individual case from the time the patient comes under observation.

Nothing short of a complete surgical program, using the different procedures according to the indication present in each individual case, will bring the maximum results in all cases. Individual lesions and their distribution determine which one or which combination of these

procedures should be used. Bilateral lesions are not a contraindication for surgical treatment but only make the use of collapse procedures more imperative.

No indications for nor description of the technique of the minor procedures will be undertaken in this paper. These are fully dealt with in textbooks and current literature. Since the subject of thoracoplasty in its modern aspects has not appeared in the textbooks as yet, this subject will be dealt with briefly.

### *Thoracoplasty.*

The original or German conception of this operation was a massive collapse of one hemithorax executed at one operation. The attending 50 percent mortality was prohibitive even though some of the surviving patients were cured. Notwithstanding this high mortality, the idea was not abandoned but a rapid succession of changes ensued with two ideas in mind: (1) reduction of mortality; and (2) making the operation more effective. Instead of a 50 percent mortality with a few cases cured, the procedure has been so perfected that today in the best clinics of the United States it carries as high as 85 percent cures and a mortality no greater than other major surgical procedures. As late as three years ago these figures were not considered possible. The effective changes and modifications of the original operation which have brought about these results are too numerous even to mention here, but a few of the more important steps will be enumerated and a short description given. As we look in retrospect on the criteria of scarcely three years ago, the improvements up to date have been truly dramatic.

(1) The operation as originally planned was from below upward, that is commencing at the eleventh rib and removing short sections of all ribs including the first at one operation. The location and extent of the pathology was disregarded. The operation is now done from above downward and is adapted to the pathology present.

(2) The present incision starts one inch below the lower border of the trapezius muscle, as did the paravertebral incision, and swings around the scapula to the posterior axillary line or farther in heavy persons. The scapula can then be raised by cutting the upper digitations of the serratus-magnus muscle and exposing all the ribs from the first to the seventh. This type of incision permits removal of long sections of ribs, thus making the operation effective in a large percentage of cases including those with giant cavities.

(3) The number of stages was increased to two, and later the multiple stage procedure of Hedblom was adopted.

(4) More wisdom in the selection of cases added greatly to the reduction of the mortality and is still one of the intriguing problems that has not been entirely solved. It has been proved, however, that patients with productive lesions lend themselves best, and that acute, widespread, exudative lesions are a specific contraindication to thoracoplasty. It has also been learned that no patient should be operated upon until there is evidence that definite resistance to the infection is present.

(5) The operation is adapted to the pathology present in each individual case; that is, in apical lesions a partial thoracoplasty is done, collapsing only the apex of the lung, conserving all good lung possible. This only a short time ago would have been considered the rankest heresy.

(6) The removal of all of the first rib, including its costal cartilage, all of the second and third ribs, including the transverse processes, the costal cartilages and a portion of the sternum, if necessary, make it possible to close the largest apical cavities which by the older method could not have been closed. The conservative method of removal of these ribs is essentially as follows: Through the posterior incision, all of the first rib and long sections of the second and one-half of the third ribs, with their transverse processes, are removed at the first stage. Later, after the chest wall has stabilized (two

weeks or, better still, three or four weeks later), the second stage in the back is done, removing another section of the remaining portion of the third rib and long sections of the fourth and fifth ribs and their transverse processes. Subsequently an anteriolateral operation is done at which the first costal cartilage and the remaining portions of the second and third ribs with their costal cartilages are removed. Subsequent operations in the back in incomplete thoracoplasty are done in stages of not more than three ribs. In this way the mortality is kept low without interference with the effectiveness of the procedure.

(7) The painting of the periosteal surfaces with 10 percent formalin to retard the regeneration of bone is another decided advance. More time between stages of operation is thus possible. This has been no small factor in reducing the mortality. Formerly, without the use of formalin on the periosteal surfaces, it was necessary to do the succeeding stages in rapid succession, concluding the whole series of operations in three to four weeks, or before regeneration of bone in site of former operations. With the use of formalin, thirty, sixty or even ninety days delay is permissible, and in many cases advisable.

(8) Reduction of operating time, which is obviously important, has been made possible; limited operation and team work are the two factors.

(9) In partial thoracoplasty, where it is necessary to remove sections of only four, five or six ribs, resection of a portion of the scapula, as brought out by Holman, to make it fit snugly on the decostalized pleura has been found a splendid movement. The seating of the scapula in this manner aids materially the collapse, also limits paradoxical respiration, and prevents painful friction between its lower angle and the sixth and seventh ribs.

(10) Pre-operative treatment as regards emptying of cavities and bronchi

of sputum before anesthesia has proved of great value in preventing bronchogenic spread.

(11) Postoperative treatment, which is most important, has lost many of its horrors since the modern operation has been adopted. Blood transfusions and oxygen tents are seldom needed. Morphine without atropine is administered freely. It is important to have the patient cough at regular intervals for the first forty-eight hours and raise the same amount of sputum daily as before operation. Five per cent sodium chloride solution, 300 to 500 cc. intravenously, followed by 2000 to 3000 cc. normal saline or Hartman's solution has been found to lessen nausea and vomiting and prevent abdominal distention. Since we have used these solutions as described, and discontinued the use of glucose, we have had no serious case of ileus, and the convalescence is usually comfortable and uneventful. Some exceptions have been reported by Thomas and Harper in the *Journal of Thoracic Surgery*.

#### *Summary:*

1. Pulmonary tuberculosis is a surgical disease and is best treated by early collapse measures.

2. Early diagnosis and early collapse will reduce the morbidity and mortality to a minimum.

3. Collapse measures should be used individually, collectively, and successively without loss of patient's time which means waste of opportunity.

4. The best results in collapse therapy are obtained through the co-operation of both internist and surgeon, in other words group practice.

5. Thoracoplasty has undergone many and rapid changes during the last five years, which has reduced the mortality on a par with other major surgical procedures, and effects cures in 85 per cent of the cases operated.

# Hodgkin's Disease

WHILE TUBERCULOSIS is always to be kept in mind in making a diagnosis when a patient presents himself with obscure pulmonary or other suggestive signs and symptoms, nevertheless tuberculosis frequently becomes a dumping ground for numerous vague non-tuberculous conditions which assail mankind, and which on careful study and investigation can be properly diagnosed. One of these conditions, arising on account of early cervical glandular enlargement and either early or late pulmonary manifestations, is Hodgkin's disease.

This condition was first described by Hodgkins in 1832 and has since been variously designated as lympho-granuloma, pseudo leukemia, lymphosarcoma, malignant lymphoma, splenic anemia, chronic relapsing fever, lymphadenoma and anemia lymphatica. This confusing terminology illustrates the difficulty in arriving at a satisfactory classification of this condition which is considered an infection by some and a neoplasm by others. The histo-pathology in brief however is more suggestive of a neoplastic than of a granulomatous process. The typical form of the disease is characterized by a slowly progressive enlargement of the lymph glands throughout the system, a progressive secondary anemia, fever, and generally a fatal termination within three to five years.

## *Age and Sex.*

Hodgkin's disease is most common in young adults and relatively rare after the fourth decade of life, but is not at all rare in childhood. Ziegler in reporting 220 cases found 16 and 17 percent respectively in the first two decades of life. The condition is twice as common in adult males as in females. In younger children in the first decade of life the predominance of males is very much greater, being approximately four to one.

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Smith of Ann Arbor, in reporting 23 cases in children up to 14 years of age, found only two females, while in six years at the same institution (The University of Michigan) the total number of adult cases reported showed 66 and 34 percent respectively for males and females. These percentages rather tend to nullify the theory held by some that the disease might be related in some way to repeated infections of some sort, as males are supposedly more frequently exposed to infectious agents by occupation. In the younger groups one would hardly expect the environment of one sex to differ greatly from the other. On the other hand it is logical to assume that the matter of sex points rather to the type of etiology for Hodgkin's disease as well as for leukemia or true lympho-sarcoma. Smith points out that of nineteen children with lymphatic leukemia fifteen were boys, while of eleven children diagnosed as having true lympho-sarcoma only one was a girl.

There are no constant reports in the literature relating Hodgkin's disease to preceding infections and possible foci of infection. Some observers have thought that conditions in the nasal sinuses, mouth, and throat play some etiologic role because of the common onset in the cervical glands. This however has not been found to be the case by those reporting large series of cases, aside from the fact that it would be difficult to associate Hodgkins' disease in very young infants with such an etiology. There does, however, seem to be a slight familial tendency to the disease, as several cases occurring in the same family are not at all rare, and it is particularly common in the same family in twins.

## *Relation to tuberculosis.*

This relationship has been the subject of considerable study. Sternberg in 1898 thought that Hodgkins' disease was a

glandular form of tuberculosis, but Dorothy Reed and Longscope definitely decided that they are two separate disease entities. Not so long ago L'Esperance claimed he was able to produce avian tuberculosis by inoculating chickens with material extracted from the enlarged glands and has attracted fresh attention to the possibility of such a connection. Ewing states that family history showing tuberculosis or tuberculous lesions in the body is the rule in these patients. Ziegler, however, claims that it occurs in only about 20 percent of the cases. Parker and his associates in a study of pathologic rather than clinical material have found a significantly greater percentage of tuberculosis both healed and active in Hodgkins' than in other types of lymphoma. This author in the past several years, has observed two cases of Hodgkins' disease, one co-existing with an advanced pulmonary tuberculosis, and another with a minimal early upper lobe involvement. Both patients had positive sputum and both came to autopsy which confirmed the diagnosis of both conditions.

A rather interesting paradox is the relative infrequency of positive tuberculin reactors in Hodgkins' disease. Bastai suggests that this might be explained by a tuberculin anergy produced by the disease. He found that following radiation therapy, negative reactors often gave a positive reaction. It may be suggested that it is because of this anergy that tuberculosis is so often found associated with this disease and spreads so rapidly, particularly in view of the fact that many of these cases are wrongly diagnosed as tuberculosis and placed in sanatoria where they are continuously in close contact with the tubercle bacillus.

### *Symptoms.*

The disease is very insidious in its onset and the usual history is the discovery of a painless, slowly enlarging gland. The most common site of enlargement is in the cervical glands and more frequently the glands of the left side are the first

to be involved. Feer has offered this explanation: that there is truly a primary involvement of the retroperitoneal and mesenteric lymph glands. By lymphatic extension such processes would first show themselves in the left neck glands, because of the course of the thoracic duct. This seems reasonable as even symptomatically many patients have constipation alternating with diarrhea and abdominal distress even early in the course of the disease. It also indicates the importance of directing radiation treatment to the abdomen as well as the cervical region which appears to be the only seat of involvement. No tissue in the body is exempt and the first involvement may even occur in the bones or central nervous system. Usually other tissues become infiltrated as the disease progresses, but it is found early in its course in the mediastinal, axillary, mesenteric and inguinal glands. The spleen and liver are involved later in the disease and can be readily palpated. Their enlargement is a serious prognostic sign. Cutaneous manifestations frequently occur as a simple urticaria, petechiae, edema, bronzing or other non-specific lesions, or there may be actual dermal infiltration with the Hodgkins tissue.

As the disease progresses there occurs malaise, anemia, cachexia, and fever with certain sequelae resulting from pressure of tumorous glands such as nausea, vomiting, diarrhea and abdominal distress from mesenteric involvement, or respiratory difficulties from encroachment on the bronchi and mediastinum such as to produce symptoms resulting from atelectasis, abscess formation, or pleural effusion. Parasthesias can occur from pressure on the nerves as also delirium and palsies from central nerve involvement. As the disease progresses, fever is usually a constant feature and ranges from 100 to 104 degrees.

The blood picture generally shows nothing characteristic except a progressively increasing anemia, a relative increase in lymphocytes and a relative leukopenia,

(Continued to page 28)

# Common Errors in Diagnosis

EARLY pulmonary tuberculosis is frequently overlooked and we have tried in a general way to answer the question WHY, as we reviewed 4,693 case records recently at St. John's Sanitarium, Springfield, Illinois.

Even today, the majority of patients are advanced when first admitted to the sanitarium, although we have noticed a very marked change during the past ten years. Ten years ago, histories given us by patients indicated that a fairly large percentage of them had been to a number of doctors before tuberculosis was discovered as the cause of their illness. Today, I am pleased to state this does not happen nearly as often. Ten years ago we had only a small percentage of patients who came for observation and diagnosis. During the past ten years there has been a steady increase in this percentage and we now have a large number who have been admitted for observation and diagnosis. This is very encouraging for it means that the general practitioner is no longer satisfied to take the responsibility of advising his patient until all evidence obtainable is before him, especially in doubtful cases.

In looking for the most common and therefore the most important causes of failure to recognize an early pulmonary tuberculosis, we believe at the present time in this part of the country that the most important cause is the **FAILURE OF THE PATIENT TO SEEK MEDICAL ADVICE WHEN SYMPTOMS FIRST APPEAR** and the failure, frequently, of cooperation with the doctor during the period of early development of the disease. This attitude on the part of the patient is probably the result of lack of appreciation of the need of seeking medical advice early in any and all sickness and, of course, his lack of realization of the nature of tuberculosis which is frequently a misleading disease, pro-

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gressing over months or even years without alarming symptoms.

The doctor's main error, speaking generally, appears to be not a lack of knowledge but a failure to insist on having all possible evidence before him before he is satisfied with a diagnosis.

The doctor in general practice sees the early case first, and if the case is typical he seldom errs in his diagnosis; but with a considerable percentage of the cases atypical, it is necessary that he keep tuberculosis in mind as a possibility even where other illness appears more likely to be causing the symptoms, particularly if the symptoms present are common also in tuberculosis.

Among the more common errors **DIGESTIVE DISTURBANCE** is found misleading. According to many histories given, patients were treated over a long period of time for indigestion, thought to be due to improper diet or health habits in a nervous or overworked individual. Many of these patients appeared to have symptoms of ulcer and were treated for this condition. Others were treated for colitis or liver and kidney trouble, and quite a large number had appendectomies which did not result in relief from symptoms. In most of these cases the symptoms were not typical of the condition being treated, although they were suggestive. In most of these cases, during the preceding years, the patient had been given a careful examination by the doctor in his office including history, physical examination of the chest, blood pressure, and urinalysis. In most of these cases the doctor appeared satisfied when the physical examination of the chest was negative and an x-ray of the chest was not taken (had a film of the chest been made, the condition would have been evident). When illness of this nature does not respond to treatment in a short time, make x-ray films and sputum tests and

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in children tuberculin tests, seek for a history of contact, and if necessary place the patient under close observation before eliminating tuberculosis.

*Neurasthenic Patients* are frequently treated over a long period of time for various conditions which are not clearly diagnosed. A search may be made for focal infection, for menstrual disturbance, or for various other conditions which might account for the nervous state, the diagnosis only becoming clear after x-ray films of the chest and laboratory tests are made.

*Thyroid Cases*, where the thyroid is thought to be the cause of ill health, are treated for this condition and operated without definite relief of the symptoms or improvement in the patient. Further examination, sometimes at a considerably later date, will disclose a pulmonary tuberculosis which was present before the thyroid gave trouble (we must not forget it is a common symptom of tuberculous toxemia for the thyroid gland to become involved and the pulse to become quite rapid).

*Infection of the Upper Respiratory Tract* is a very common cause of error and must be carefully differentiated from early tuberculous infection in the chest. We find from a history of these patients that a considerable number were treated for sinus infection or diseased tonsils or teeth, which conditions were believed to be the sole cause of their illness. However, the patient failing to improve should be immediately given the benefit of a search for other cause of illness including chest x-ray, etc.

*Conditions with Symptoms pointing Directly to the Chest* are not so commonly mistaken as the preceding; however, they still show frequent mistakes. Acute bronchitis may remain a satisfying diagnosis over too long a period of time while the real cause of the symptoms (tuberculosis) may be spreading. In the meantime these patients are frequently a source of danger to others. Asthma is often misleading and requires detailed evidence for diagnosis. Influenza, very

commonly reported in the history as the beginning of "lung trouble" may not have been watched closely enough by the doctor to make sure of a complete recovery in a reasonable length of time. Dust inhalation not only satisfies many patients as to the cause of their chronic cough but occasionally appears to satisfy the physician also without a complete examination including x-ray and laboratory tests.

In all cases with symptoms involving the chest, an x-ray film should be insisted on and laboratory examinations made, including repeated concentration sputum tests (and bear in mind negative sputum tests do not rule out tuberculosis).

*Less Common Errors*, although still common enough to require mention, include pleurisy, especially with effusion, which was not followed by careful examination or supervision; at a later period a far advanced pulmonary tuberculosis was recognized. The same is to be said of hemoptysis which was thought to be due to a cardiac or throat condition. Rectal abscess or fistula occasionally is not followed up for a complete diagnosis. Hoarseness, especially if complained of at intervals only, may be passed by without complete examination. Even continued cough and expectoration may not lead to careful examination including sputum tests and x-ray. Remember that absence of physical findings in the chest does not exclude active pulmonary tuberculosis; it may show plainly in an x-ray film. Loss of strength, loss of weight, occasional temperature, increased pulse, irritable nerves may be laid to other causes without a searching examination.

*Errors of making a positive Diagnosis of Tuberculosis when it is not present* are among the less common errors. When this does occur the real cause of the illness is generally found in the chest, next often in the upper respiratory tract, and occasionally in the digestive tract, thyroid, or elsewhere.

To get early cases of tuberculosis under treatment at a time when recovery can be expected, the patient must be more ready to seek advice. Further education relat-

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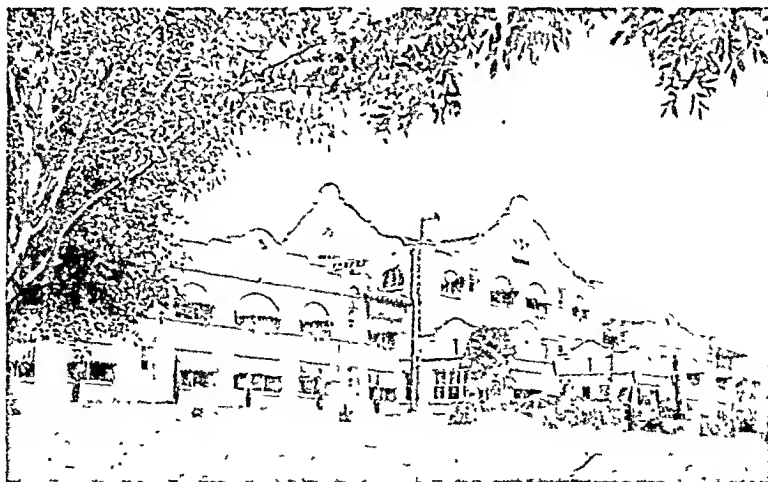
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ing to the value of early treatment in all conditions pertaining to health is needed; health examinations at regular intervals are to be encouraged as a check on all diseases. The doctor, when the patient comes for help, must always keep tuberculosis in mind as a possibility. He must not remain at ease with a diagnosis in mind based only on scant evidence, but must work to secure all possible evidence before ruling out tuberculosis. When he does this, these more common errors in diagnosis will seldom occur. It is not our

lack of knowledge but our lack of thoroughly working out the details of the case that causes the error. *More Work—Less Error.*

With our present knowledge is there anything more important in the entire field of tuberculosis than encouraging the patient to seek advice early and reducing the errors in diagnosis? These steps would greatly increase the number of recoveries and lead to further progress in the field of prevention.

#### STANDARDIZATION OF TUBERCULOSIS CASE FINDING PROCEDURE IN SCHOOLS—(Cont. from p. 15)

fore be considered as tentative and subject to revision as future experience and new discoveries may dictate:

1. Insistence on a frank statement to the public that to be of value, the tuberculin testing of non-reactors and x-raying of the chest of reactors must be repeated yearly, conducted by competent and experienced personnel only. In order to conserve funds, such tests to be restricted to higher age groups and to include teachers and school nurses of all grade schools.

2. Emphasis to be placed on finding the open adult type of tuberculosis in its communicable stage.

3. Legislation for compulsory proof from school personnel of freedom from pulmonary tuberculosis in its infectious stage.

4. Wherever practicable the uniform use of the Mantoux method of tuberculin testing in 1/1000 dilution of O.T. preferably the P.P.D. equivalent of one injection only in mass testing; in individual testing in clinic and private work, however, a second test with 1/100 or its equivalent being recommended. Suggestions to be made to manufacturers for the reduction of the cost of P.P.D.

5. The x-ray examination to be considered satisfactory with either paper or celluloid film or fluoroscope, the competence and experience of the interpreter and the technician being the all-important factor.

6. The school authorities to assume the sponsorship of the entire project, aided by the Tuberculosis League, the Tuberculosis Division of the Board of Health, or the Sanatorium authorities where available.

7. Only physicians trained in tuberculosis work, with a broad view of the tuberculosis problem to be considered as qualified to conduct tuberculosis case-finding projects in schools and entitled to reasonable compensation.

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**HODGKIN'S DISEASE**—Continued from page 21).

particularly when the temperature is taken into consideration. As the disease progresses towards its terminal stage these patients become bedfast with extreme weakness, progressive edema, and anasarca until death comes from sheer exhaustion.

The average duration of life is reported to be about three years, although there are instances on record of fifteen years duration. There are, on the other hand, definitely acute fulminating cases whose course terminates fatally in from three to eight months regardless of treatment. In the more common forms, however, the disease is insidious and more slowly progressive with remissions and relapses. Those who have the most prolonged course are those in whom radiation ther-

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# MORE ABOUT THE ENDOCRINES, IN THE ACTIVE TREATMENT OF PULMONARY TUBERCULOSIS

(Continued from page 12).

waxy material necessary for the protection of the tubercle bacilli. If this is true, it appears that a more rich supply of cystine would be indicated in the diet, thus sparing nature the necessity of tearing down a considerable quantity of protein to get the required amount of sulphur for calcification. It may be that in the early process of the disease an impairment of the pancreas is effected which does not allow it to isolate this amino-acid from the protein molecule so it can be utilized. It is probable that if this is indicated a study might be made on the concentration of taurine in the bile of various animals to find one which would be capable of furnishing pancreatin extract with the required amount of enzymes necessary to furnish this available amino-acid.

As taurine is a rough index of the amount of cystine in the body, it might be that animals having a larger proportion of taurine in the bile may have this due to the exceptional activity of their pancreatic enzymes to isolate this amino-acid.

Apparently the proteolytic enzyme of the pancreas is more complicated than

would appear, because at times, even though it may apparently be acting normally as an enzyme, it is still not doing its complete work. In the case of asthma, hypersensitivity, etc., it has not separated the protein into its constituent amino-acids and has allowed some portions of the combined acids to enter the blood stream. It may be possible that part of this breaking down of amino-acid and particularly the cystine separation is lost in the case of tuberculous persons.

If Mr. Owen's idea is correct about the depletion of the sulphur containing amino-acids in the body, giving the pancreatic extract will necessarily replenish the amino-acids required for repair. In this case one would find the same state of affairs existing as in the calcium content of the blood plasma—sufficient amounts, but inability on the part of the endocrines to play the major part in their utilization.

I wish particularly to thank Miss Viola Ellis of the San Antonio Regional Office, U. S. Veterans Administration for her many courtesies, and able assistance during the preparation of these articles.

## ABSTRACT

*Racial Aspects of Tuberculosis in Mexico, Donato G. Alarcon. Am. Rev. of Tuberculosis, Vol. XXXV, No. 1, p. 6.*

The Author who is the Medical Director of the Tuberculosis Sanatorium of the Public Welfare of Mexico in Mexico City, discusses the tuberculosis mortality and morbidity rates among the Mexican population. He points out that tuberculosis mortality is particularly high among mixed-blood people (Spanish-Indian) because of their great number, crowded living conditions in industrial centers. These people are usually seen first in the advanced stage of the disease (70 per cent in the authors practice). They usually have a caucaxudative type of disease with little fibrosis. The immediate response to modern means of treatment is good. Race has no influence in the immediate results of artificial pneumothorax or

other surgical procedures or in hygienic-dietetic treatment.

Mortality rate in Mexico is estimated at 69 per 100,000 population. The rate in Mexico City has dropped from 500 in 1900 to 130 in 1930. The author believes this due to better living and working conditions in Mexico.

The author also points out that the average Mexican family consists of five—the natality rate being higher than the United States. This together with the poor living conditions increases the incidence of the disease.

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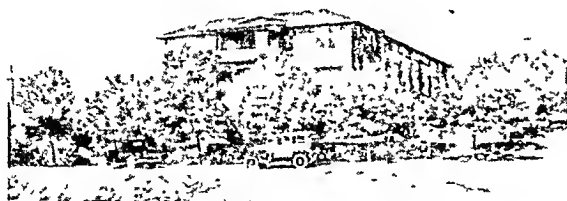
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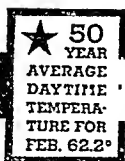
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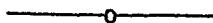
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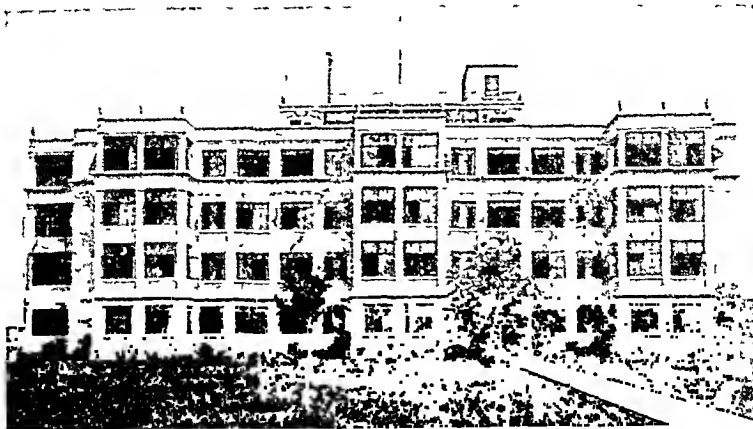
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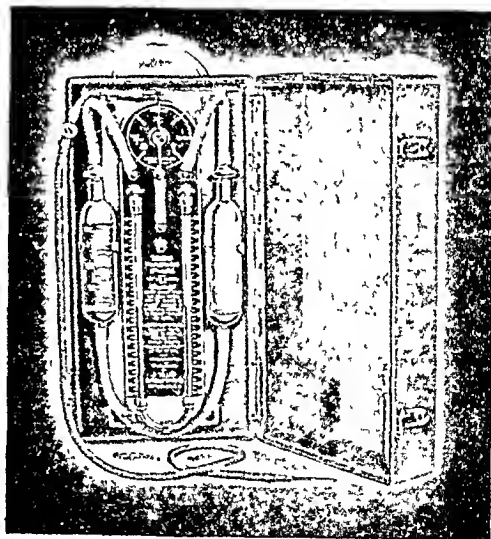
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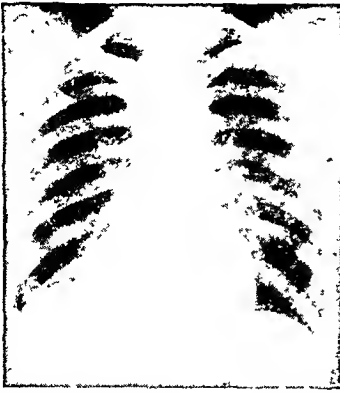


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*"This Open Letter is Addressed to Physicians and Officials connected  
with Industrial and Welfare Organizations."*

# COMMITTEE ON ECONOMICS FEDERATION OF AMERICAN SANATORIA

*(A National Association of Private Sanatoria and Chest Specialists)*

MYRTLE AND VIRGINIA STREETS

EL PASO, TEXAS

January 1, 1937.

Gentlemen:

This is the *thirteenth* in a series of open letters addressed to physicians and officials of welfare organizations. If you did not receive the previous issues, we will be pleased to furnish you with copies upon request.

It is the purpose of the Committee on Economics of the Federation of American Sanatoria to bring to the attention of physicians and to those officials who see large groups of patients, the facilities which the private sanatoria of this country have to offer to the tuberculous.

The first sanatoria in this country were established through private initiative and by private funds. We have come a long way since then, but our experience has taught us that individual private care can best be obtained in a private sanatorium.

The pioneers in the fight against tuberculosis have been the physicians in the private practice of chest diseases. They have kept in step with the modern trends of diagnosis and treatment. They are today, the members of the Federation of American Sanatoria and you will find them listed in our recent Pneumothorax Directory.

For your convenience, we have listed below the private sanatoria affiliated with the Federation of American Sanatoria. They are the finest private sanatoria in the United States and they are well equipped to cater to the welfare of your patients. Elsewhere, throughout this journal, you will find individual listings of these sanatoria.

For further particulars address any of the sanatoria or write to the Committee on Economics of the Federation of American Sanatoria at the above address.

Sincerely yours,

COMMITTEE ON ECONOMICS,  
Federation of American Sanatoria.

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*"The most important factor in diagnosis in  
 the majority of cases of pulmonary tubercu-  
 losis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

**Season's Greetings** THE EDITORIAL Board of DISEASES OF THE CHEST extends the Season's Greetings to all of our readers. We have resolved to continue what we believe an intelligent fight against tuberculosis. We feel that by emphasizing especially, early diagnosis and the segregation of the open case, much can be accomplished. We have resolved to present in the pages of DISEASES OF THE CHEST, such simple readable articles by distinguished Tuberculosis Specialists that will be helpful to all physicians in the practice of medicine.

We have also resolved to concentrate our efforts in the campaign against tuberculosis by offering such messages through the pages of this journal that will tend to keep the busy bed-side physician "Tuberculosis Minded". It is our opinion that many more cases of tuberculosis will be discovered early if our messages are put before the profession at large with an appeal for their co-operation in the effort to absolutely control the tuberculosis situation.

The Editorial Board welcomes at all times suggestions, case reports, articles and queries. Your Board needs your help in making DISEASES OF THE CHEST useful in its intended field.

C. M. H.

**Taking Stock** It is customary for most concerns to take stock at the end of each year; it is also a good

custom for organizations to follow suit. Members of organizations should also take stock of their accomplishments and what their efforts have produced.

The Federation of American Sanatoria has been in existence about a year and a half. We now quote from the record:

1. During this short period, more than 200,000 copies of its official publication, "DISEASES OF THE CHEST" have reached into physicians' offices throughout the United States and into many foreign countries.

2. A "Pneumothorax Directory", the first of its kind ever published, has been compiled and released. Plans have been effected to publish a revised edition of this directory annually.

3. The Statistical Committee of the F. A. S. is now in the midst of compiling a report on the percentage of patients in the various sanatoria, who are receiving some form of collapse; the number of patients who are awaiting hospitalization, the number of beds available for patients, along with other pertinent information. To-date, this information has been received from 326 sanatoria in the United States.

4. The Statistical Committee has also prepared a questionnaire which will be sent to all recognized medical schools, in order to ascertain the number of hours devoted to and the methods used in the teaching of diseases of the lungs to the

junior and senior students of those schools. It is our plan to have all recognized medical schools adopt a uniform curricula for the teaching of this subject. There is room for much improvement in this direction.

5. A program on the various aspects of chest diseases was presented last year, at the meeting of the American Medical Association. This program was designed to appeal to the physician in the general practice of medicine. It is planned to repeat a similar program at the Atlantic City meeting of the A. M. A., in June of this year.

6. The Editorial Board of DISEASES OF THE CHEST has carried forward its campaign for the early diagnosis of chest diseases and for the isolation of the open case of tuberculosis, directed to the physician in the general practice of medicine. This campaign will be continued during this year and an interesting program of papers on various phases of chest diseases, and allied subjects will appear each month in the journal. These papers will be contributed by recognized authorities in their respective fields.

These accomplishments, are such that any organization may well be proud of. However, we cannot and must not rest upon past laurels. We must forge ahead to greater accomplishments during the year which is now unfolding itself before us. Therefore, let each of us resolve to do our part, to carry forward the work so ably started.

M. K.

**Case Finding** WE HAVE always maintained that the role of the private physician in case finding is most important. Recently, a report by Dr. Bruce Douglas and Dr. John H. Handlin of Detroit revealed that in Detroit the cases of tuberculosis on record for 1935 number 9,388 in all stages of the disease. Of the 4,490 adult type 63 7/10 per cent were reported by private physicians, however, only 13 5/10 per cent minimal cases were reported by private physicians. The city physicians reported 15 2/10 per cent of the minimal cases and school surveys

revealed 30 8/10 per cent of the minimal cases.

It is easy to explain why the private physician finds more moderately advanced and far advanced cases than other agencies, as the majority of cases he sees are really ill. The early case, with very mild, or no symptoms, rarely consults the private physician. If the private physician would become more interested in seeking contacts among cases of those he discovers and by the use of the tuberculin test and the x-ray, he could uncover many more cases in the early stages. If all of his contacts were studied systematically, he could easily reduce the number of advanced cases in his findings. Since the private physician is the chief source of new cases reports, he should be encouraged more and more.

The service required in making surveys of minimal cases has not been done in the majority of instances because the service could not be paid for, and arrangements have not been made, to date, for such services. We are happy to quote here a very healthy attitude revealed in the Bulletin of the National Tuberculosis Ass'n. of December, 1936 which is as follows:

"Since the private physician sees so many cases it is suggested as a practical control measure, he be encouraged in his case findings, both as to method and by financial assistance in the form of fees, to be privately paid when possible, or publically when the patients' circumstance warrants." This method is far better than taking from him the large volume he already does and replacing his efforts with those of other agencies.

**Membership Campaign** THE MEMBERSHIP campaign of the F. A. S. started off with a bang. The enrollment of members for 1937 shows a twentyfive per cent increase over the same period last year. If you desire to receive a listing in the 1937 "Pneumothorax Directory" send your application in at once. If you do not have an application form, we will be pleased to mail one to you.

R. B. H., JR.

## President's New Year Message

The *New Year* edition of *Diseases of the Chest* comes to you today with a message of increased hope. The past year has been one of hard work on the part of your officers and committees.

The Membership Committee has divided the United States into thirteen districts with one of the committee in charge of each district. Today our membership reaches 207, as recorded in our 1936 Pneumothorax Directory. This is a big increase over last year.

It is our hope that the coming year will find the entire staff of tuberculosis physicians linked together in a stronger working plan to bring to the general practitioner the importance of *early diagnosis* of tuberculosis. I feel this is the basic principle in the fight against the disease.

Too much stress has been placed on the findings of the stethoscope. In many cases the physical findings are very few or may be absent. In these the physician and patient are lulled into a sense of false security by the statement of the physician—"I cannot find anything wrong." The time has come for us to outline an easier method. The grouped experience of many men has placed in our hands several factors which, if carried out, will eliminate guess-work to a very great extent. In the first place it is important to talk things over with your patient. Find out how long he has been feeling bad. Ask him how long he has been tired; how long he has had a cough; how much weight he has lost; whether he runs an afternoon temperature and then just ask yourself, "Have I had several *sputum tests* made? Have I had him *x-rayed*?" If you have not, then ask yourself why you have not had a sputum test made and an x-ray taken. Much future trouble and sorrow will be avoided if you do these things for all suspicious cases.

Next year I shall not be your President, but if I can be instrumental in impressing on each of the members of the *Federation of American Sanatoria* these few facts and if you will carry this message to your county and state societies, the *Federation of American Sanatoria* will have done its share and will have justified my faith in its existence.

I hope we shall have a large attendance at the Atlantic City meeting. Bring with you any ideas you have for any plan to enlarge or better the work of the *Federation of American Sanatoria*.

WILLIAM DEVITT, M.D.,  
President,  
*Federation of American Sanatoria.*

# Hypothesis on the Active Treatment of Pulmonary Tuberculosis\*

THE ACTIVE treatment of tuberculosis can be attempted along lines of Endocrine Therapy. This includes Thyroid, Adrenal, or the required combination of the ductless gland substances.

When the thyroid, derived from tuberculous cases, is examined histologically, the changes are those of sclerosis, as a rule—the direct antithesis of those found in Graves' disease. It is not generally appreciated, but it is a fact, that in patients with symptoms of hyperthyroidism, tuberculosis, when it does occur, runs a very mild course; in many the abortive type of the disease is to be seen. In cases in which the differential diagnosis between hyperthyroidism and phthisis has to be made, we are often actually dealing with the co-existence of the two diseases, but the lung lesion is so mild, the patient recovering, and remaining with the thyroid dysfunction, that we are apt to conclude that the suspicion of phthisis was not justified. In progressive phthisis we may note symptoms of hyperthyroidism in the incipient stage but with the advance of the tuberculous disease they disappear. They may also disappear when the lung lesion improves, or when the patient is cured of his tuberculosis. The transitory character of the hyperthyroid symptoms, disappearing with the aggravation as well as with the improvement of the tuberculous process, is rather suggestive. It appears that the tuberculous toxin stimulates the thyroid at first but when the stimulation keeps on for a considerable time it is effective in producing sclerosis of the gland, and for this reason we find sclerosis of the thyroid in many, many fatal cases of tuberculosis. Moreover, hyperthyroidism is often found in youthful tuberculous patients, in ado-

BY  
F. W. DIRMANN, M.D.  
San Antonio, Texas

lescents, in young girls in whom menstrual disturbances—dysmenorrhea, amenorrhea, etc.,—are the clinical features of the case.

The mildness of tuberculosis in hyperthyroid individuals was observed fifty years ago by Hamburger, and Morin noted long ago that in tuberculous families the members who have large thyroids escape, and when infected, recover. S. Solis Cohen stated as far back as 1887 that a large thyroid is characteristic of immune members of tuberculous families. Greenfield could not find tuberculous lesions in any of the fatal cases of Graves' disease that came under his observation. Similar experiences have been reported by Sloan, and Gerald Webb, and many others have had the same experience. In Webb's experience and opinion, "The increase in the size and function of the thyroid is a phase in marshalling of the body's defensive force against the invading disease." Webb quotes Plummer of the Mayo Clinic, where large numbers of cases of exophthalmic goiter are treated, to the effect that tuberculosis is much more rare in persons with this disease than in others. Hypothyroid individuals, on the other hand, very frequently suffer from active and progressive tuberculosis of the lungs. In fact, in thyroid families some children are myxedematous, or cretins, while others are tuberculous. W. S. Greenfield speaks of "the great tendency of myxedema to tuberculosis. Of course, it may occur in Graves' disease but as far as I can judge there is no special tendency to it. In myxedema it is especially frequent." In five out of seven fatal cases of myxedema, tuberculosis of the lungs was found at autopsy; while in none of the cases of Graves' disease was tuberculosis found.

Symptoms and signs of hypothyroidism are very often noted in far advanced cases of tuberculosis. Experimentally, it has

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been repeatedly found that thyroidectomized animals show a diminished resistance to tuberculous infection. Hoffman considers the thyroid a special means of defense of the organism against tuberculosis, and hyperplasia of the gland a protective mechanism. He particularly warns against operating on the thyroid without considering the possibility of tuberculosis following thyroidectomy. It has been suggested that the thyroid is probably exerting its influence in this direction through its stabilizing action on calcium metabolism. There is considerable evidence to the effect that thyroidectomized animals show a greatly diminished resistance to tuberculous infection.

In a very large proportion of cases of pulmonary tuberculosis there are to be seen symptoms pointing to disfunction of the adrenals—Low blood pressure, as well as weakness and lack of endurance, myasthenia, pigmentation of the skin, etc., have been attributed to hypofunction of the adrenals. The great frequency with which these glands are found affected by tuberculosis in cases of phthisis, favors the view that this is due to insufficiency of the adrenals. Many writers have seen a correlation between the excessive function of the thyroid in incipient tuberculosis and the insufficiency of the adrenals. It is noteworthy that while in nearly ninety per cent of Addison's disease tuberculous changes are found in the adrenals, active tuberculosis of the lungs is very rare in this disease; most of the lung lesions found at autopsy are of the sclerotic type. In fact, tuberculous lesions in the lungs found in many cases of Addison's disease are almost invariably of slight extent and healed. Cases showing the symptoms of hyperthyroidism, in incipient tuberculosis, would be given adrenal therapy, and the chronic cases where the hyperthyroidism is lacking would be given a combination of thyroid and adrenal substance. The latter type of case would receive both thyroid and adrenal substance because it has been clearly shown that there is a sclerosis of the thyroid in tuberculosis with hypothyroidism,

and feeding the tuberculosis patient the internal secretion of the thyroid stimulates the adrenal medulla. The increase of adrenalin so caused provokes the liver and other cells to discharge their glycogen into the blood as glucose and the elevation of the blood sugar thus produced stimulates the islands of Langerhans in the pancreas to secrete insulin. This, in turn, facilitates carbohydrate metabolism and affects the nutrition and activity of most of the tissues and organs of the body.

Modes of reinfection in human beings under the following captions present facts that are very important points on phthisiogenesis:

(a) Reinfection in sanatoriums and hospitals for consumptives.

(b) Tuberculous disease in medical students, physicians and nurses.

(c) Marital phthisis.

It may be noted also that tuberculous infection can only occur once, and that phthisis develops only in persons who are, for one reason or another, constitutionally predisposed to the disease.

In as much as the non-phthisical consort has already been infected with tubercle bacilli during childhood, new opportunities for reinfection by cohabitation with a consumptive are of no avail to produce phthisis. It is his or her constitution that determines whether consumption will develop and not the opportunity for reinfection. I wish to state that the constitutional predisposition spoken of so often, in my estimation, has its foundation in the condition of the endocrine system. The integrity of this system prevents tuberculous disease, and impairment or disfunction precipitates tuberculous disease.

The process of resistance remains obscure; and immunity is apparently always relative. It appears clear that the circulating antibodies—bacterio lysins, antitoxins, precipitins, agglutinins, opsonins, etc.,—play little or no part in the struggle of the body against the invading tubercle bacilli. It would, therefore, seem that humoral mechanisms are not of primary significance in tuberculous immunity, but,

rather, that the fixed tissue cells bear the brunt of the struggle; consequently the resistance manifested by the human body may depend entirely upon the normality and integrity of the endocrine system.

Further proof that an unbalanced endocrine system predisposes to adult tuberculosis is borne out by the following: During the years when most of the human infections take place, between the second and the fourteenth, the mortality from all forms of tuberculous disease is comparatively low; then, at the age of fifteen, there is another increase in the death rate which keeps on rising so that from the twentieth year onward the maximum has been reached, keeping up until advanced age.

On the other hand, when the ductless glands are presumably functioning normally (up to puberty, or adolescence) the predominant type of tuberculosis is glandular. This would lead one to believe that the ductless glands have a controlling influence over the lymphatic system. It is only after puberty as a rule that this bodily co-ordination is lost and phthisis develops. Why should the child have relative immunity and the adolescent lose it; and why should one of every seven to ten people die of pulmonary tuberculosis, if immunity, which was supposed to have been attained during childhood, plays a major part? It is true that healed tuberculous lesions have been found to contain viable and at times virulent tubercle bacilli and the fact that this is the case in clinically arrested tuberculosis would certainly contradict the idea of immunity per se.

We cannot consider these patients "carriers" in the true sense of the word because they can be re-infected by the same micro-organisms autogenously, whereas, in true "carriers," the organism can infect others but not the same person. Therefore, if nature herself cannot guarantee a natural cure, how can the

medical profession hope to obtain it through induced immunity? The experimental work and research done along immunological lines since discovery of the tubercle bacillus by Koch in 1882 are, I believe, in vain.

The following are some of the causative factors of endocrine insufficiency, predisposing to the development of active tuberculosis: Acute infectious diseases, puberty, influenza, syphilis, and congenital weakness of the ductless glandular system, so that a not-well-definable deleterious agent brings this system to degeneration. *Active tuberculous infection* itself must also be emphasized as a causative factor.

Speaking of the suprarenals, Elsasser found, among five hundred and forty-nine cases from literature, isolated tuberculosis of the suprarenals in seventeen per cent; in forty-eight per cent there was combination with pulmonary tuberculosis; and in the rest of the cases tuberculous foci in other parts of the body.

My theory infers that in sixty-five per cent of the above mentioned group the adrenals were involved with tuberculous lesions secondary to the initial ductless gland sclerosis, and in the remainder, while no microscopic examination was reported, a sclerosis probably existed which was no doubt primary. In four hundred and seventy-two cases the lesions of the suprarenal were bilateral. We must, therefore, turn our attention to a new method in the treatment of tuberculosis—endocrinology and endocrine therapy—if the above facts are to receive the proper consideration that they so justly deserve.

The text books on Pulmonary Tuberculosis (Fishberg) and Endocrinology (Falta, Meyers) have been freely consulted and appreciation is hereby acknowledged.

NOTE: The second part of this paper will be published in the February issue.

# Surgical Collapse of the Lung

MOST OFTEN one interested in thoracic surgery is called upon to talk to men interested in general surgery, and it is with extreme pleasure that I accept this invitation and opportunity to exchange opinions on the treatment of pulmonary tuberculosis, and especially with regard to its surgical treatment.

Functional rest of the lung, as a result of body and postural rest, is admittedly the most important factor in the modern sanatorium treatment of pulmonary tuberculosis. It is quite sufficient to bring about recovery in a large proportion of cases in the early stage, and in some moderately advanced cases, provided it is possible, and provided that the patient can be persuaded to continue the rest cure sufficiently long. When the disease has advanced, however, to more extensive infiltration with cavity formation, healing may take place as a result of prolonged bed rest, but in a vast majority of cases the disease progresses and invades the opposite lung, the intestines, or the larynx, and, sooner or later, the condition becomes hopeless. Hence it is generally recognized by plithisio-therapists that something beyond routine sanatorium care must be given.

In a majority of cases, when a tuberculous infiltration is present to more than a minimal extent, and when the patient has a positive sputum, the failure of bed rest to bring about the desired results in the large proportion of even moderately advanced cases, particularly those with cavity formations, has forced the development of other methods of bringing about recovery.

Since Koch's dramatic announcement of the discovery of tuberculin in 1890 we have observed, with scarcely less disappointment, the failure of numerous other cures for tuberculosis, such as Maragliano's serum, Friedman's turtle serum,

BY  
RAYMOND J. FRIEL, M.D.  
Salt Lake City, Utah

Dryus vaccine, Moolgard's sanocrysin, Brothers' trico-tyl, and so forth. The failure of all efforts to find some

specific, curative serum, vaccine or chemotherapeutic has, more and more, directed attention to the development of methods for giving added rest to the lung and closing offending cavities by surgical, or at least, by some operative procedure. Bacteriology as a baby promised much in medicine. It has proven a most distressing failure in most fields and especially in the treatment of pulmonary tuberculosis.

As young a field as thoracic surgery is, it is still a massive field to cover in the treatment of pulmonary tuberculosis. The purpose of this paper is to relate our own personal experiences with the use of various methods of lung closure. While numerous surgical procedures have been proposed from time to time in the treatment of pulmonary tuberculosis, only those which have proved of value are included under the term "operative collapse therapy," and which have for their objective function rest of the lung and closure of cavities obtained in mechanical ways through collapse of the lung.

Operative collapse therapy is, unquestionably, the only real contribution to the treatment of pulmonary tuberculosis since Detweiler advocated the principles of rest and conservation of vital energy sixty years ago. Today, to be even moderately successful in the treatment of pulmonary tuberculosis with cavitation, an internist, surgically minded, and a Roentgenologist with ability to localize and describe existing pulmonary pathology, are most important. Only by recognizing the ability of each separate man and weighing his opinion, can some of the disasters previously encountered in collapse therapy be avoided.

Operative collapse therapy includes many operative procedures for putting

the lung at rest and closing the tuberculous cavities; however, only four procedures have passed beyond the developmental stages and have been generally accepted as of established value; namely, artificial pneumothorax and its adjunct, intra-pleural pneumolysis, phrenic neurectomy, and extra-pleural thoracoplasty. Three other procedures, apicolysis, drainage of the tuberculous cavities, and paraffine plumbage, are of value in a few selected cases.

### *Pneumothorax.*

Pneumothorax, of all operative collapse procedures, has proved most widely applicable and the most valuable. This procedure was first noticed accidentally in the Napoleonic wars; for here it was observed that tuberculous conscripted cases who were shot through the chest and recovered from their initial shock, showed marked improvement in their pulmonary tuberculosis following traumatic spontaneous pneumothorax. Carson, almost one hundred years ago, first suggested the possibility of the use of artificial pneumothorax as treatment for pulmonary tuberculosis.

The technique will not be discussed, because it is pretty well standardized. I should mention, however, that by employing carbon dioxide instead of air for primary inflations, the danger of gas entering the pulmonary circulation and causing cerebral gas embolism is greatly lessened, because carbon dioxide combines very quickly with the blood stream. Generally speaking, small quantities of gas, from 150 to 350 cc., should be used every few days for the first few weeks, while a careful check is made of the degree of collapse by the fluoroscopic screen, or by means of Roentgen film.

### *Indications for Pneumothorax.*

Artificial pneumothorax should be utilized much earlier than is now customary. The indications vary within the widest limits, and every case presents a problem

for the physician to solve on the basis of his experience with the usual regime and pneumothorax therapy. If, after reasonable sanatorium care, that is, three to four months, a case still has positive sputum, even though the lung involvement seems to be minimal in extent, pneumothorax should be considered. The treatment should be used before destructive lesions are established, or pleuritis forms adhesions with consequent unsatisfactory collapse of the lung.

Hemoptysis, whether slight or severe, is an obligatory indication for artificial pneumothorax, as soon as the site of bleeding can be established and the contralateral side has been cleared of infected blood.

Tuberculous spontaneous pneumothorax should be converted into a controlled artificial pneumothorax.

Tuberculous pleurisy with effusion should be treated by replacing the fluid with air and an artificial pneumothorax maintained according to the indications of the underlying disease.

Ten years ago Dr. Matson, of the Portland Open Air Sanatorium, reviewed the end results of six hundred cases of pulmonary tuberculosis subjected to pneumothorax treatment during the previous twelve years, with the following results:

Of those cases in which pleuritic adhesions did not prevent satisfactory closure of the cavities or adequate functional rest of the lung, 48 per cent made clinical recovery; 18 per cent were arrested; 12 per cent were improved or unimproved; and 22 per cent were dead. In a second group of cases where adhesions did prevent adequate functional rest or satisfactory closure of the cavities, 11 per cent were clinically well; 12 per cent were arrested; 19 per cent were either improved or unimproved, and 58 per cent were dead.

Thus, we see that adhesions in the chest, preventing efficient collapse of the lung, increase the mortality rate approximately 300 per cent. In this series also were 120 cases used as controls. A pneumothorax was indicated in these cases, but no gas could be introduced because no free

pleural space could be found. These patients were subjected to prolonged, *good* sanatorium care. The end results were that five per cent made clinical recoveries; nine per cent became arrested; twenty per cent were improved or unimproved; and 66 per cent were dead. Thus we see the great importance of efficiently and adequately closing offending cavities, and if a partially efficient pneumothorax can be converted to an efficient one, the patient's chances of getting well are increased 300 per cent.

There have been a number of procedures proposed for severance of these adhesions, which, roughly, can be grouped into two large classes: first, open intra-pleural pneumolysis, and second, closed intra-pleural pneumolysis. Competent opinion expresses the belief that any adhesion that can be successfully cut by the open method can, with the newer instruments and electrical coagulation sets, be successfully cauterized by the closed method. The method of choice, whether the two-puncture method, as described in this country by Matson, or the one-puncture method, using the Cutler-Davidson operating thorascopes, depends upon the training and experience of the operator. The type of adhesion to be cauterized may influence greatly the method of surgical procedure.

Using the one-puncture method and carefully outlining on the chest wall the location of the adhesion and its approximate direction and point of attachment to the chest wall, will enable a large number of supposedly difficult adhesions to become easily accessible. The two-puncture method is preferable for the largest number of cases, because adequate exposure of the adhesion can be obtained through either the anterior or posterior opening. Oleothorax, while having enthusiastic French supporters as excellent therapy for pleural tuberculosis and for maintaining a pneumothorax that threatens to expand unless dangerously high positive pressures are used, has not found the same support among American thoracic surgeons.

One who inspects the pleural cavity through a thorascopescope, after the use of oil of gominol in either a paraffine oil base or an olive oil base, is immediately struck by the marked precipitation of paraffine and oily debris on the pleural surfaces. Inter-thoracic pneumolysis in the presence of an efficient oleothorax presents difficult problems of properly cleaning the adhesive bands before their cauterization.

A cavity, triangular in outline, in a partially efficient pneumothorax almost invariably contains some lung tissue prolonged into the adhesion, whereas if the outline of the cavity is round the adhesion perhaps contains little or no lung tissue. The production of a bronchopleural fistula in the presence of an oleothorax is not an uncommon occurrence.

### *Phrenic Interruptions*

I have titled this section Phrenic Interruptions because in recent years differences of opinion as to whether the nerve should be temporarily or permanently interrupted have caused confusion as to the proper procedure to follow. Many cases in which a complete exaeresis has been done have produced some alarming and distressing symptoms for the patient. In carefully checking our small series of cases we find that most often gastric upsets and abdominal distress have followed complete interruption of the left phrenic nerve. Complete evulsion of the right phrenic nerve will, in a vast majority of cases, give few or no distressing symptoms. Complete evulsion of the left phrenic nerve may be followed by various symptoms more or less distressing in a relatively large proportion of cases somewhat relieved by pneumoperitoneum.

Perhaps, then, we should advocate complete exaeresis of the right phrenic with temporary interruption of the left phrenic and if, after a period of six to eight months, diaphragmatic elevation is excellent and improvement has been noticed in the lung, the patient should be subjected to the second surgical procedure

and the nerve completely evulsed. This procedure is justified and perhaps should precede all extra-pleural thoracoplasty.

In a critical analysis of the bibliography of phrenic exairesis, 17 per cent of the cases in which no free pleural space could be found, and in which some collapse procedure was indicated (most often extra-pleural thoracoplasty) made complete, clinical recoveries and the more dangerous and extensive surgical procedures became unnecessary.

### *Plumbage*

Plumbage has made its appearance again and again in thoracic surgery, only to be discarded and again to be taken up with increased enthusiasm as some separate group of surgeons report increasing good results. After the abandonment of fat and muscular plugs, various types of foreign bodies have been tried with greater or less success. A mixture of paraffines with varying melting points have been tried and perhaps this type of plug, with the addition of some heavy metal, ought to produce a most satisfactory compression material. The anterior method of introduction has been practically abandoned, and if the plug is introduced by the posterior method, the procedure takes on practically the same hazards and risks for the patient as does the upper stage of thoracoplasty.

### *Thoracoplasty.*

Next to satisfactory pneumothorax an extra-pleural thoracoplasty is the most valuable procedure for putting a lung at rest and in the state of collapse. This, of course, is accomplished indirectly as a result of removing all or part of the bony framework supporting the adherent visceral and parietal pleura and its underlying diseased lung.

After undergoing many modifications in technique, credit for giving us a surgical procedure of unquestionable value and low mortality in carefully selected cases belongs to Sanerbruch and Braner. No hard and fast rules should be laid

down as to the number of ribs to be removed at each stage. The condition of the patient, the efficiency of the operating force, the ability of the anaesthetist, the competency of the post-operative nursing,—all should modify the extent of the procedure and the amount of bony tissue removed. It is better to remove smaller portions of ribs posteriorly and later to supplement the posterior stages by an axillary stage than to attempt to remove massive amounts of rib by prolonged and severe traction of the extensor muscles of the back. The question as to when the second, third or fourth stages should be done should be controlled by a careful measuring of the intravenous pressure and by relying on the opinion of the internist as to when the cardio-vascular system has returned to a point as near as possible to the condition before surgery.

While pneumothorax gives the most efficient and complete type of collapse, and while extra-pleural thoracoplasty gives the next most efficient type of collapse, sometimes social conditions, the intelligence of the patient, and his willingness to cooperate in a prolonged multiple-puncture procedure, may change the indications from pneumothorax to thoracoplasty. How often have we seen an efficient pneumothorax lost after many months of tedious effort and care, because of ignorance on the part of the patient, or financial inability to prolong his care!

While a strictly medical indication for thoracoplasty may not be present, and where some of the less severe procedures would suffice, thoracoplasty may be indicated because of the social or financial condition of the patient.

While thoracic surgery is a relatively new field, and while, as yet, operative procedures have not been standardized as well as they have been in the abdominal field, certain basic principles have been laid down which will modify the mortality rate and decrease the morbidity of the patient. Crushing of the intercostal nerve is not, at the time of surgery, time consuming and gives relief from post-operative pain. An oxygen tent 24 hours before

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# Tuberculous Empyema

TUBERCULOUS empyema is justly considered one of the most serious complications of pulmonary tuberculosis. While more recent knowledge has improved the outlook for the patient with this condition, the mortality is still generally regarded as anywhere from thirty to seventy per cent.

Tuberculous empyema develops most commonly as a complication of pneumothorax, either induced or spontaneous. It occurs most frequently in connection with the latter condition. It develops occasionally in pulmonary tuberculosis in the absence of pneumothorax.

Tuberculous empyema usually begins as a more or less clear, amber-colored fluid in which, on careful search, especially by culture or by guinea pig inoculation, the tubercle bacillus can be demonstrated. This fluid generally becomes cloudy and later may or may not contain pus as well as mixed infection. The amount of fluid may be small or large. Five or six quarts may be contained in the empyema cavity at a time. The symptoms may be very marked or mild. In the presence of a mixed infection, especially in cases of the acute type, the symptoms are usually marked and the patient is overwhelmed. In other cases, depending on the nature of the infection and the general condition of the patient, the symptoms may be of a degree anywhere between these two extremes.

In the treatment of empyema there is just one point on which there is uniformity of opinion among those familiar with the handling of this condition. That is, that open drainage, the treatment for ordinary empyema, should never be established in tuberculous empyema unless all other measures for the control of the empyema have failed. Open drainage in these cases introduces infection from without and usually leaves the patient with a draining sinus for the rest of his life and its consequent debilitating effects,

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or necessitates extensive mutilating surgery to partially undo the damage. Before an empyema in its earlier stage of treatment is subjected to open drainage it should be made as certain as possible that it is not a tuberculous empyema.

Inasmuch as there is no uniformity of opinion as to the positive treatment of tuberculous empyema, practically everything possible has been tried. These measures have all been found wanting.

There are certain cases that tend to cure spontaneously. These are the cases with a relatively small amount of non-toxic empyema spread out in a more or less thin layer in the pleural space. These may absorb or undergo organization. The milder type, even when the amount of fluid is relatively large, may clear up as the result of simple aspiration. Still other cases will yield to aspiration and irrigation. A few of the more severe cases, especially if they have been neglected, will require surgery, that is, rib resection in varying amounts, either after open drainage or after aspiration. Thorocoplasty also may at times be necessary to eliminate a pleural space caused by a failure of the lung to expand after the empyema has cleared up, or to prevent too great a deviation of the mediastinal contents in the attempt of nature to eliminate such a pleural space. Oleothorax, in the hands of some, has apparently yielded excellent results, while in the hands of others, the results have been very discouraging. This tends to lead one to believe that its use may depend upon the technique and opportunity or ability to control the patient, conditions which often determine the result of any particular line of treatment.

The condition of the underlying lung helps to determine the object sought in treatment. If the condition of the lung is such that it may safely be allowed to expand, the object is to clear up the empyema and bring the lung out. On the

other hand, if the lung must still be kept collapsed, then the object is to not only clear up the empyema, but to continue the collapse of the lung by the pneumothorax, if there was one, or by thoracoplasty.

It is my feeling that by means of the more conservative treatments it is possible to clear up a large proportion of the ordinary empyemas that occur in connection with pulmonary tuberculosis and that, under such circumstances, a great many of the serious complications such as cutaneous and broncho-pleural fistulae and unobliterated pleural spaces with their consequent results would be avoided. The clearing up of any of these serious complications means extensive and radical surgery. Fortunately, however, due to the high degree of efficiency that chest surgery has reached in more recent years, the outlook for patients with these complications has markedly improved. On the other hand, I feel that a like improvement in the so-called conservative treatment would eliminate the necessity for much of this extensive surgery.

In this discussion it is my purpose to call attention to a technique in the conservative treatment which has proved relatively satisfactory in a limited number of the cases of empyema encountered in connection with pulmonary tuberculosis. In presenting this treatment, I am aware that almost countless solutions have been tried in this treatment.

Fifteen years ago, following the report of its use in the English army, I began to instill pure grain alcohol in the pleural cavity after the pus was removed and the cavity repeatedly washed clean with normal salt solution. According to the report, the English used only a dram or two of the alcohol and, although the results were fairly satisfactory with this technique, after two or three years I discontinued the use of alcohol and in its stead used the formalin and glycerine solution according to the Murphy formula, following Dr. Kalb's report in 1922 of his results with this treatment. The formalin and glycerine treatment was relatively satis-

factory as to ultimate results obtained, but the reaction after each treatment was severe. Because of this I returned to the use of alcohol and during the past seven or eight years have employed this treatment almost exclusively in handling these cases.

The original technique of the alcohol treatment has been modified by using a larger amount of the alcohol. I usually use from a half to one ounce at the first treatment, increasing the amount rather rapidly in subsequent treatments, up to three ounces. There is no unpleasant reaction even when the larger amounts of the alcohol are used. At times there may be a slight rise in temperature for a day or two and occasionally, where there seems to be a rather rapid absorption, especially in susceptible individuals, the alcohol produces a tendency to "sleep" for a few hours following the instillation.

The technique employed is as follows: The instruments used are a No. 13 aspirating needle, a piece of ordinary stethoscope tubing about five inches long, a 100 cc. ground glass syringe, a pneumothorax outfit, ordinary pus basins, a hemostat, etc. The patient is placed on a firm table with the involved side up, the field is prepared, the site selected for aspirating is thoroughly anesthetized with novocaine, the needle with the tubing attached is inserted into the empyema cavity and the tubing is then clamped with a fairly large hemostat. The patient then turns completely over so that the good side is up. The hips remain on the original table and the shoulders rest on a small, well padded table which has been placed alongside the head of the original table. The patient is then in such a position that the needle is in the bottom of the empyema cavity and extends directly downward. The lower end of the needle is also free in the triangular space between the two tables, permitting easy access for the operator. If the empyema cavity is so located that it cannot be entered from the axillary region, the position of the patient is changed accordingly, so that the aspirating may be done from the bot-

tom of the cavity, the object being to wash the cavity clean. A pus basin is placed on a low bench directly under the tubing, which is attached to the needle. The hemostat is now removed from the tubing and if the fluid is not too thick or the pressure too negative in the cavity, the fluid will run slowly into the basin. The glass syringe is now attached to the lower end of the rubber tube and the cavity aspirated. While the syringe is being emptied the rubber tube is clamped. Air is injected into the pleural cavity through the fluid by means of the aspirating syringe as it is needed to keep the patient comfortable. Ordinarily, with a needle of this caliber, the pleural cavity can be completely emptied before any of the irrigating solution is introduced. If there is trouble due to flakes, some of the saline can be injected by means of the syringe at any time.

When the original fluid is all out of the pleural cavity, the cavity is repeatedly irrigated until the last washings are clear, using from a pint to a quart or more of the saline. The patient is then turned back onto the original table with the good side up and with the aspirating needle and the rubber tubing in place, the tubing being clamped. The barrel of the aspirating syringe is connected with the tube, the amount of alcohol to be used poured into the syringe, the clamp temporarily removed, and the alcohol allowed to run in or is gently forced in by the plunger of the syringe. The clamp is then replaced and the pneumothorax outfit connected with the rubber tubing. The clamp is removed and the pressure within the pleural cavity regulated. The clamp is again replaced and another smaller syringe is connected with the tubing, and by means of this syringe a small amount of iodine is left in the needle tract as the needle is withdrawn. A firm gauze pack is placed over the needle hole and tightly strapped with several pieces of inch adhesive reaching from the posterior to the anterior midline and the patient instructed to lie as much as possible on the good side for the first few days. The iodine, the firm

strapping, and the position are for the purpose of preventing the possibility of a sinus developing in the needle tract. The strapping is left on for three or four days.

All cases, whether acute or not, that are being aspirated should be kept pretty closely to their beds during the period of treatment. At the beginning, the treatments are repeated at least every week. After several treatments, the period may be gradually lengthened, if the condition warrants. When the fluid becomes sero-sanguineous and free from infection, the treatment is discontinued.

I have used this treatment both in private practice and in hospital work, but I am including only the results from private practice here because the opportunity for control of the hospital cases was not sufficient. I realize that the number of cases treated is very small, but I am presenting them because I feel that the method of treatment is worth while and deserves further trial. In twenty-two cases the results were as follows:

One case cleared with no treatment.

Five cases cleared with formalin and glycerine treatment.

One case with treatment of formalin and glycerine alone failed to clear.

Nine cases with treatment of alcohol alone cleared.

One case with treatment of alcohol alone did not clear.

Four cases with treatment of formalin and glycerine and alcohol did not clear.

One case with treatment of formalin and glycerine and alcohol cleared.

The four cases which failed to clear with the formalin and glycerine also failed to clear when alcohol was used instead of formalin and glycerine. In the six cases that did not clear, four had either extensive tuberculosis and long-standing, neglected empyemas or a very poor general condition. Two of the earlier cases in good general condition failed to clear. I feel that had they been kept more quiet perhaps they would have had a better chance

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# Utilization of Southern Sanatoria for Under-Graduate Training\*

THE TUBERCULOSIS sanatorium has come to occupy a unique position among institutions for the care of the

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sick. Established to exploit an idea of treatment and located, as a rule, in inaccessible places with a view of employing natural therapeutic agents, we have seen it, in comparatively recent times, develop and expand under the impetus of more extensive and accurate knowledge into a modern, well-equipped hospital with complete facilities for all forms of care. We have seen it moved from the mountain and placed at our door, making its benefits available to the many where formerly only a few could profit.

Designed to treat only those slightly ill, its doors now have been opened to all stages of the disease, which has tended to project its usefulness into another domain—that of public health—for the segregation of the infectious types has removed active foci of the disease from the community environment. Already the effect of this "mass infection" removal is being shown in accelerated mortality and morbidity trends.

It is an interesting observation that institutional care of the consumptive in England prior to 1850 brought a rapid decline in the mortality from tuberculosis in the subsequent decades. This was brought about somewhat accidentally.

The fact is that the consumptive in many instances early became a pauper and sought refuge in the almshouse. Thus he was removed from his environment and lessened the number of contacts<sup>1</sup>.

Had the sanatorium done no more than serve as an isolation hospital, removing the communicable cases of the disease from their surroundings, giving these unfortunates comfort and repose in their

extremity, and teaching the fundamentals of hygiene to those coming under its influence, it would justify its

existence.

But much more is being done by the sanatorium. It is teaching the public and the individual patient that tuberculosis is curable and preventable. Was it not its early success in therapy, bringing, as it did, hope and inspiration to a vast host of humanity, which has culminated in the present great movement for the eradication of this dread disease? Within its portals thousands upon thousands of tuberculous sick are being taught the principles of healthful living and personal hygiene, which is contributing measurably to more hopeful prospects for control of this disease.

Furthermore, the sanatorium has developed into a center for research. Many contributions to our knowledge of the bacteriology, pathology, diagnosis and treatment of tuberculosis have originated under its roof.

Perhaps one of its most vital functions is that of an educational institution. It is here that post-graduate instruction is frequently given to physicians and nurses. Our leading specialists in the respiratory diseases have gleaned their most valued experiences there. The sanatorium has been the hub, especially in America, around which have revolved the most effective programs of preventive work.

The properly conducted modern tuberculosis sanatorium has then a threefold value—curative, preventive, educational.

It is this last function to which I would direct attention. It seems to me rather an odd commentary on our methods of medical instruction that in spite of the many years of the sanatorium's existence, in spite of the wealth of clinical material and the availability of able teachers, only

\*President's Address, Southern Sanatorium Association, Hot Springs, Arkansas, October 1st, 1936.

in very recent years have these unparalleled resources been appreciated and utilized for the under-graduate.

Perhaps the failure of deans and professors of medicine to appreciate these opportunities may be due, as Moorman charitably suggested several years ago in his excellent plea for a better place for tuberculosis in the curriculum<sup>2</sup>, to the inaccessibility of the sanatorium to the medical school.

Personally, though, I feel convinced that there was a lack of "intuitive sagacity" in medical pedagogy, if nothing worse.

More than a decade ago Sir Robert Philip, of Edinburgh<sup>3</sup>, said: "In view of the predominant part played by tuberculosis in mortality and disease incidence, and the rapid strides recently made in the elucidation of tuberculosis—clinical, pathological, epidemiological, sociological—there is a clamant need for fuller training of physicians and nurses."

It is generally conceded even today that the graduate in medicine has an "inadequate appreciation of the problems of tuberculosis"<sup>4</sup>. Much blame has been placed on the general practitioner for his failure to diagnose and handle properly cases of the disease coming to him. Might not the blame for this be traced further back? If it is believed he is a vanguard of the forces combatting this disease, should not more aggressive effort have been exerted that he, as a student, might obtain the fundamental facts in the diagnosis and treatment of this disease?

The disease and its problems should not be taught as a specialty, but rather as a part of the course in internal medicine, definitely integrated with the whole clinical program. For, as Moorman has pointed out, "It is impossible to teach tuberculosis without teaching the broad principles of general medicine"<sup>5</sup>. However, I do believe that in order to obtain a comprehensive view of the clinical aspects of the disease, its early and late appearances, its complications, the methods employed for its detection, the varied

courses it pursues and the accepted methods of treatment, it is essential that the student be given these opportunities so abundantly afforded by the sanatorium.

I have no prescribed course to advocate, but were I in a position to do so, I would demand that the student be so taught that in diagnosis he should rely on a careful clinical history and a properly interpreted Roentgenogram in early disease rather than on physical examination (Braenning has stated that "early pulmonary tuberculosis must be seen and not heard"); that in treatment *rest* is still the sheet-anchor of therapy, but collapse procedure must be constantly kept in mind; that prevention of the disease is the ultimate goal and can be achieved to no small extent by the application of the principles of scientific epidemiology. I would demand that each student be required to have a definite period of sanatorium instruction. These institutions are available all over the country at the present time for this purpose. Thousands of beds are capable of being used, and there is an ample supply of well-trained clinicians whose services could be drafted.

In order to secure information as to whether our Southern sanatoria are being used for this purpose, I sent out a questionnaire to the medical directors of the majority of the institutions within the conference area. Although these data are not complete, they are sufficiently accurate to illustrate the point desired.

In this investigation twenty-eight sanatoria responded to the questionnaire. For the purpose of analysis, these were divided into three groups.

In the first group were placed those sanatoria in which no under-graduate teaching of any kind is done; in the second group those in which some little effort is being made in this direction; and in the third group those in which there is definite evidence that their facilities are being used for this purpose.

The first group consists of 12 sanatoria with a total of 2,380 beds; in the second group there are 8 sanatoria with

1,774 beds; and in the third group there are 8 sanatoria with 2,631 beds.

The teaching in the second group consisted largely in the employment of a small number of medical seniors during the summer months. The sanatorium usually accepted from one to four of these, who, although not given an arranged course, were permitted to do the work ordinarily performed by an interne,—history taking, physical examination, x-ray and laboratory work, and the administration of treatments under supervision.

In the third group there were several located in close proximity to universities and medical schools, which are apparently giving a scheduled, well-regulated course of instruction. In one of these, students are required to spend two weeks in the institution and are given an intensive course of instruction. In another, one week of residence is required. In others, a certain number of hours are arranged for lectures and demonstrations each year. The course, as a rule, was limited to senior students, although in some instances juniors and even sophomores secured some form of tuberculosis instruction. On the whole it would seem that the medical schools in the South are impressed with the need of utilizing sanatoria for clinical purposes, but it would appear that in only a comparatively few could the instruction be deemed adequate. However, it would not be possible to draw a correct conclusion in this regard, because we have no way of estimating the amount of teaching given on this subject in connection with the chest services of the various teaching institutions.

I do not believe that it is possible to standardize any form of teaching; nor am I convinced that, were this possible, it would be advisable to attempt it. However, the importance of education in the fundamentals of chest disease would seem to warrant some minimal standard; and it would seem to me not improper that, even though short, a certain definite period of residence in a tuberculosis sanatorium might be made mandatory.

It will be seen that in the non-teaching

and in the limited-teaching groups of sanatoria, embracing 4,150 beds, little or no value is being derived from an undergraduate educational standpoint. At the same time there are numbers of well qualified and well trained experts in these institutions, whose talents are being neglected and whose services would be a real contribution in making better and more capable medical graduates.

Each year we have approximately 500 junior medical students in our Southern schools, the majority of whom are unoccupied during the summer vacation. Many of them would welcome an opportunity to spend these months gaining practical knowledge and experience about such an important subject as tuberculosis and diseases of the chest. Were it possible to secure this type of training for a large percentage of these young men and women, it would equip them for a better comprehension of the disease and its problems.

This is a task to which the Southern Sanatorium Association might address itself. It seems to me a feasible plan could be worked out and handled by an efficient secretary at a nominal cost, whereby the institution and the student could be brought together to mutual advantage. It would be an opportunity for this Association to render a very valuable service in the making of more efficient, more interested, more tuberculosis-minded general practitioners, the effect of which would be to render added strength to the forces at work for the eradication of this disease.

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## Diagnosis of Early Tuberculosis

KNOWLEDGE of the diagnostic points of pulmonary tuberculosis is so widespread that it seems almost

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a waste of time to reiterate them. Yet well-known paths are sometimes a little carelessly and thoughtlessly trod. In a disease so destructive of health and life and wasteful of time and money as is tuberculosis, reviewing the early signs which may point to simple and effective and almost preventive treatment may be worth while.

I stress the urgency of careful, complete examinations, reexaminations, and continued observation of individuals who present even one of numerous evidences of tuberculosis.

The first fact of importance is a history of contact. We have recognized that more fully in children than in adults, but it is important also in adults. We often see tuberculous patients who have had no known contact. But that patient who has had definite contact should be regarded with more suspicion and should be more carefully observed than his symptoms may at first seem to warrant.

The history is important too as regards loss of vigor, loss of interest or failure to carry out accustomed activities, unaccustomed tiring, loss of weight, or inability to regain weight after stress or acute illness, loss of appetite or enjoyment of life. These things go with the insidious onset of tuberculosis. Later comes afternoon fever usually in the insidious case. In the more acute onset, fever and night sweats may come first.

More specific symptoms pointing to tuberculosis are pain in the chest and cough. Transient pains may prove to be of no importance, but the physician should at least determine a cause for the pain; whether due to overexertion, costal strain,

strain, a chronic or acute bronchial and accessory pulmonary infection, true neuralgia due to focal in-

fection, or a more serious condition such as heart disease or malignancy. Possibly the older practitioners were more astute than we in ferreting out the cause of pain. True fibrinous pleurisy always means definite infection in the chest and most often tuberculosis, if pneumonia is ruled out.

Cough may come from a variety of causes, but if the heart is excluded it is usually from the larynx, bronchi, or lungs. I have seen only one actual case of severe paroxysmal night cough in an old man whose uvula, elongated and edematous, actually rested, when relaxed, on the vocal cords. Shortening the uvula relieved the cough, but this cause is very rare. Cough coming first from the larynx is also comparatively rare, except in acute laryngitis which quickly subsides. Primary cough caused by tuberculosis of the larynx also is rare. Polypi and other growths in the larynx are uncommon. I believe also that cough caused by dropping of secretions into the nasopharynx from the sinuses is uncommon and that no cough should be ascribed to this cause without careful demonstration of its existence.

Cough from an acute bronchitis is more common, but if the physician assigns this cause for a patient's cough, reexamination must be made at least monthly for three months to be sure that there is not some underlying more serious etiology.

Cough due to hay fever is not uncommon, but should disappear quickly under appropriate therapy.

Chronic bronchitis and bronchiectasis with or without asthma commonly cause cough. These conditions can be readily differentiated from tuberculosis by lipiodol injections and x-ray film. Occasional-

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ly, tuberculosis is diagnosed when examination would show bronchiectasis and, of course, more commonly bronchitis has been diagnosed when the actual condition was tuberculosis.

The raising of sputum always means intrathoracic trouble—bronchitis, bronchiectasis, abscess, tuberculosis, other rare infection, of malignancy. I do not believe that patients raise sputum from the trachea or bronchi because of droppings from the sinuses into the nasopharynx.

Unaccustomed dyspnea on exertion may rarely be a first sign of tuberculosis.

Blood spitting is one symptom that should put a physician definitely on guard. Pyorrhea as a cause of hemoptysis is certainly most uncommon. Varices in the upper air passages, pharynx, or esophagus are also rare. On the other hand, hemoptysis is not uncommon in bronchiectasis. However, this is usually a chronic disease and therefore should not be confused with tuberculosis. Certainly, hemoptysis occurs most commonly in tuberculosis, and tuberculosis should be carefully excluded before diagnosing any other cause for it.

A symptom complex which not infrequently has first brought a tuberculosis patient to the physician is that of so-called "flu" or influenza; occasionally also a diagnosis of pneumonia is first made in this type of patient who some weeks or months or perhaps a year or more later proves to have tuberculosis. Certainly not all so-called "flu" is tuberculosis, but it is also certain that these cases must be observed and reexamined at intervals after their recovery from so-called "flu", if tuberculosis is to be ruled out or discovered at an early stage.

Pleural effusion is another condition that should not be lightly passed over. When no other etiology is present, a large percentage will be due to obscure tuberculosis. Frequently it is wise after aspiration of fluid to cause temporary pneumothorax until the lung can be thoroughly x-rayed and tuberculosis with cavity ruled out. Even when no tuberculosis can

be diagnosed, it still may be present. Recently a young patient of mine with effusion and no demonstrated lung trouble, but in poor general condition, was in bed three months, made marked improvement, and was about to be released when he developed fatal tuberculous meningitis.

Spontaneous pneumothorax rarely is a first sign of tuberculosis. Some cases of spontaneous pneumothorax probably are not tuberculous in origin, but all must be carefully observed and the patients re-examined repeatedly.

Some acute fevers though at first to be due to other conditions prove to be tuberculous.

The average case, however, with which this paper is concerned has only vague symptoms—cough, pain, loss of weight, malaise, and so on.

Examination should be general and thorough. For the chest it includes inspection, palpation, percussion, and auscultation before and after cough. Listening to the chest after cough is of great importance in eliciting signs of early disease. Fluoroscopy is of value.

Most important in this early case is the x-ray film, preferably stereoscopic. I believe that endeavoring to save a patient's money by not having an x-ray film made is often in the end a waste, both of his time and money, and often of his health.

The blood examination is next in order. Anemia should be discovered, if present. The white blood count is of value chiefly for the differential count. A high monocyte count and a relatively low lymphocyte count is somewhat indicative of tuberculous activity. The sedimentation rate, if rapid, will support other positive findings of tuberculosis. Urinalyses and sputum examinations should be made.

Sputum may have to be examined repeatedly and possibly by culture and guinea pig inoculation before being declared negative. Even repeated negative sputum tests do not disprove tuberculosis.

If a positive diagnosis cannot be made, but some of the findings or symptoms point toward tuberculosis, the patient

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should return for reexamination at intervals of a few weeks.

It may be important to make a stool examination, agglutination for Malta fever, and other tests to prove that the condition is not something else than tuberculosis.

What harm may we do by failing to make a diagnosis? I cite a case of my own. In 1928 a young single woman stenographer of 22 consulted me because of a hacking morning cough. I was caring for her sister who had advanced tuberculosis and soon died. I knew that this stenographer had been a great deal with her sister and had slept in an adjoining room. The history otherwise was negative. There was no sputum, no loss of weight, no tiring, no apparent fever, no night sweats, no pain. Her general health was excellent. She looked robust. She had palpitation of the heart on excitement. Physical and fluoroscopic examinations were negative. No x-ray picture of the chest was made. Blood pressure was 120/80. the pulse rapid, the pulmonary second sound accentuated over the aortic second sound. Temperature was 98.3. The tonsils were moderately enlarged.

This patient did not return for re-examination, but I saw her frequently at her work and she seemed well. Fifteen months later she saw another physician who found a cavity in the top of the right lung. She later developed a cavity in the left lung. I have seen her in consultation and know that she has been treated by bilateral pneumothorax, that she will never be entirely well and that the cost of her medical care has been close to \$1000.00 at moderate rates. In addition she has lost already about 7 years of normal life.

The course of this case probably indicates a low resistance to tuberculosis, yet had I kept her under observation after my first contact with her I might have saved her loss of time, money, and health. The cost of repeated examinations and x-ray films does not compare with the loss of this girl's health.

Let us start in April, 1936, with the

next case, again a young woman of 22, married, with a child 6 month's of age. She had a dry cough, slight fever, no sputum. Two weeks before, she had spit up a little blood and had pain in the right chest on deep breathing. She had caught colds easily for three years. She had dullness over both lungs and scattered fine rales following cough in the lower right chest in back. Fluoroscopic examination showed marked shading through the right lung and in the upper left. Her hemoglobin was 80 per cent, the sedimentation time 28 minutes, the white count 10,200, lymphocytes 20 per cent, and monocytes 6 per cent. Physical examination alone was sufficient in this case to make a diagnosis of tuberculosis. The x-ray film was corroborative, but showed no cavities of moment. This girl may recover by a prolonged sanatorium regimen without special treatment.

By close questioning, we learned that this girl had spit up blood two years before. She was then an early case of tuberculosis. The physician who saw her made a thorough examination and an x-ray film of the chest. His diagnosis was probable bronchiectasis, but he suspected tuberculosis and advised the patient to return in two months. She did not return. In fact she was so unimpressed with the need of reexamination that she told me her previous examination and x-ray had shown no tuberculosis. I believe she was wrong and that her former physician did caution her. I gain from this incident the impression that we, as physicians must more strongly urge on a suspected tuberculous patient the real danger of not keeping under observation.

This second case may not be out much money because of her failure to avert widespread active tuberculosis, but she will have impaired health the rest of her life.

A more favorable case is that of a young man, single, a chemist, whom I saw in 1926. He also was 22. He had had scarlet fever at 16, measles at 20, and a cough for 6 months with some sputum. About 2 weeks before I saw him he had streaks

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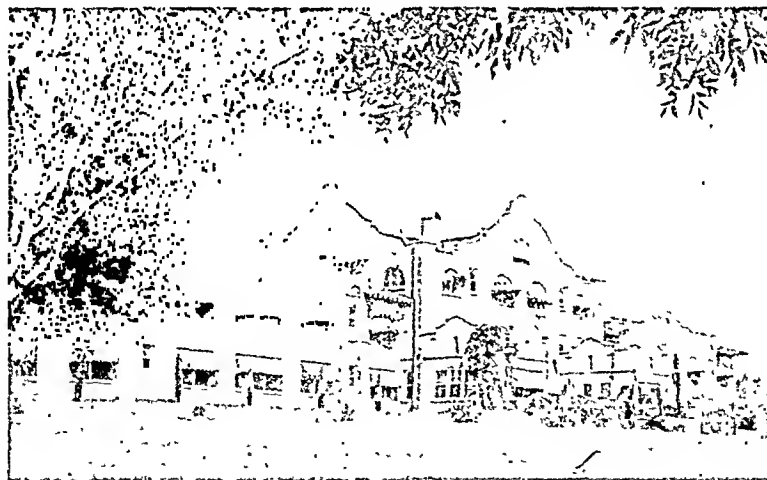
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of blood in the sputum. He had lost 3 or 4 pounds.

Physical examination showed slight depression and impairment of the apices. The x-ray film was reported by Dr. W. W. Watkins as follows: "Radiograph of this chest shows abnormal amount of hilus density about equal on the two sides. There is a moderate fibrous striation density into the upper lobe areas, more marked on the left side over the first, second and third interspaces. The shadows reach well out into the periphery over the upper lobe area of each side but do not have the definite characteristics of parenchymatous activity."

Despite the almost negative physical examination and almost negative chest x-ray this boy's sputum test was positive. It was never positive again. A few months of sanatorium regimen put him back to work and good health.

*Conclusion:* I think it worth while to reiterate what you all know. We need to be reminded to examine our patients thoroughly; we must examine, reexamine, and reexamine. If we find tuberculosis early, we not only save lives, but health, waste of time, money, and suffering and will do much toward stopping the spread of this disease.

#### TUBERCULOUS EMPYEMA—(Continued from page 17).

to overcome their empyemas. One of these was treated with formalin and glycerine and the other was treated with alcohol. In two cases treated with alcohol the empyemas subsequently returned. One of these, in other hands, was treated by open drainage which later necessitated exten-

sive surgery. The patient is now well. The second case developed a broncho-plenral fistula which also necessitated extensive surgery to eliminate the empyema pocket and close the fistula. I might say it so happened that these cases were all cases without mixed infection.

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**SURGICAL COLLAPSE OF THE LUNG**—(Continued from page 14).

and 48 hours after the operation may help to prevent anoxemia of the patient.

The time of the operation should be chosen according to the ability of the patient to produce his sputum, taking place in the afternoon, if necessary. The posture of the patient during surgery is perhaps not as important as we have been led to believe, and whether the patient is operated on sitting up or lying down depends on the individual preference of the surgeon.

Extra-pleural thoracoplasty under local anaesthesia has, in most communities, been abandoned since the demonstration by Dr. Matson that novocaine containing dyes injected into the proximity of the intercostal nerve, 6 cm. from the mid-vertebral line, may pass along the perineural nerve space for some distance from the point of injection. In discussions we have found dye substances in the sheath of the rami communicants extending to the sympathetic ganglia and also to the spinal dura. Thus, it is easy to understand that the toxic symptoms of novocaine, instead of being due to the hypersensitivity of the patient, may be caused by the rapid absorption of the anaesthetic by the spinal dura, or by its absorption into the sympathetic ganglia. Therefore general anaesthesia has almost entirely replaced the use of local anaesthesia and the use of general anaesthesia preceded by a hypnotic that is not particularly depressing to the respiratory system.

Ethylene seems to give less lung irritation, and, because of the high percentage of oxygen, the amount of anoxemia is considerably decreased.

The choice of the first stage is a matter of preference, and perhaps the greatest area of activity should be attacked first. The danger of aspiration into the lower lobe when the upper stage of thoracoplasty has been done perhaps has been exaggerated. To restore the shoulder function, active and passive movements should begin a few days after the operation. Postular rest on the side of the operation should be carried out as soon as possible to improve the collapse of the chest wall. The patient is placed in an adjustable hammock two or three days post-operative. This not only increases the amount of collapse, but aids in the prevention of scoliosis toward the operated side, and consequently prevents elevation of the shoulder on the side of operation.

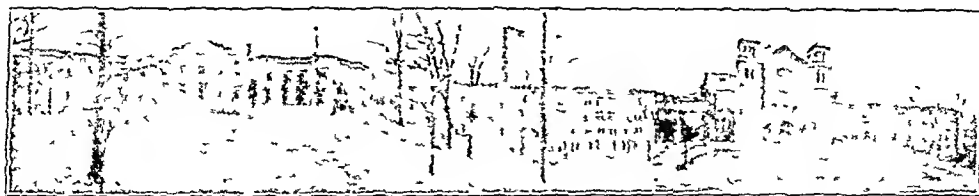
*Conclusion.*

The number of cases that should be treated by operative collapse therapy is higher than one would suppose. If operative collapse procedures were utilized to the extent indicated many otherwise hopeless cases of pulmonary tuberculosis would be rehabilitated while a constant source of infection would be removed from society.

---

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## Should we Continue the Examination of Children for Tuberculosis?

SURPRISING as it may seem to many of us, the real value of an extensive diagnosis campaign among children has been questioned, and this by a physician of several years experience in the general practice of medicine. He calls attention to the fact that in studying Roentgenograms of adults, about forty per cent of the plates show old healed and calcified lymph nodes about the hiluses, and that in these individuals no diagnosis was made in childhood, no treatment was instituted, the usual life of the average child was experienced, and yet these individuals apparently overcame the childhood infection, and have experienced no apparent inconvenience from it. In his opinion, this was sound logic to prove that to make a diagnosis of tuberculosis in children while the disease was still of the childhood type and, therefore, confined largely to the lymph glands, was of little value.

To many of us such an opinion and such reasoning are preposterous, but to our friend the reasoning seemed sound and the conclusion a fact. Presuming that there may be others who concur in this opinion, we feel that it may be well to enumerate some of the benefits which result from an extensive diagnosis campaign among children.

1. As to the child. It is undoubtedly true that many children do have the childhood type of tuberculosis without ever having any inconvenience from it, but, on the other hand, a large per cent suffer the contrary experience. In some, especially if the glandular involvement is extensive, there is a caseation and spread to the lung itself, becoming the adult type, which, as we well know, is usually fatal in young children. The same result follows in children in whom there is apparently a natural low resistance to tuberculosis.

BY  
R. B. HOMAN, SR., M.D.  
El Paso, Texas

In many others, the disease may be quite well under control until the child reaches his teens when he is going through that trying stage of development, which makes unusual demands upon the physical strength. In addition, he is assuming the added burdens of high school and college, as well as many social demands, all of which contribute to so lowering the resistance that active tuberculosis of the lung results. We all know the difficulties encountered in overcoming the disease during that stage in life.

So while it is true that some of those who receive the infection in childhood escape further inconvenience from the infection, no doubt many more would do so if the diagnosis were made at the proper time and the child have the supervision and care which it should have.

2. To the community. It is a well known axiom that every case of tuberculosis comes from another case. It is a very difficult matter to find the other case in the average community with our ordinary methods of investigation.

In most diagnostic campaigns among school children and other groups, the finding of tuberculous children has been the means of locating many heretofore unknown open cases of tuberculosis in the community. With the institution of proper sanitary measures, the further spread of the disease from such open cases is avoided, thus making the campaign of great value to the community.

In this age of preventive medicine, let us not question any measure which, even in a small way, provides a means for reducing the source of infection in any of our infections and contagious diseases.

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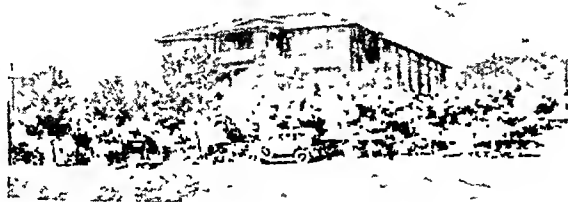
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